CHNOLOGY DEPT.

# Gas Journal

VOL. 276. 105TH YEAR. LONDON, NOVEMBER 18, 1953. NO. 4720. PRICE 1/3

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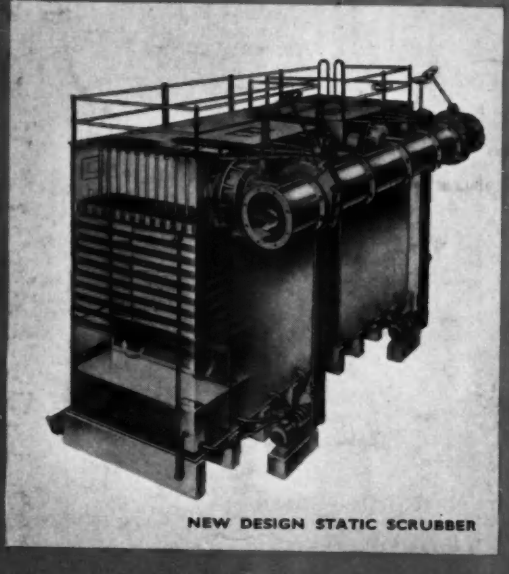

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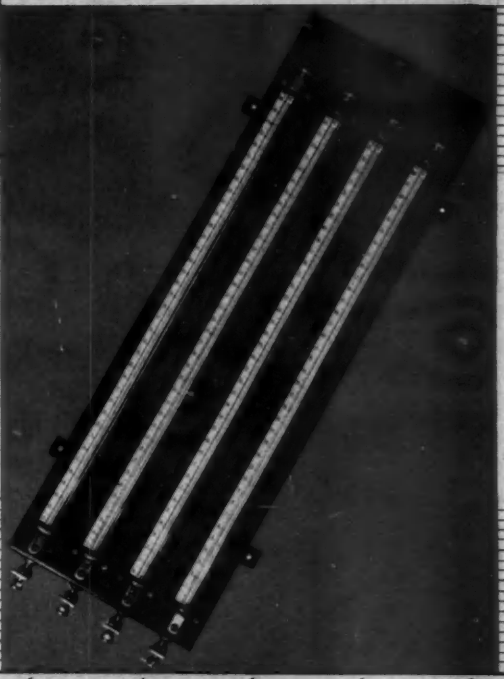

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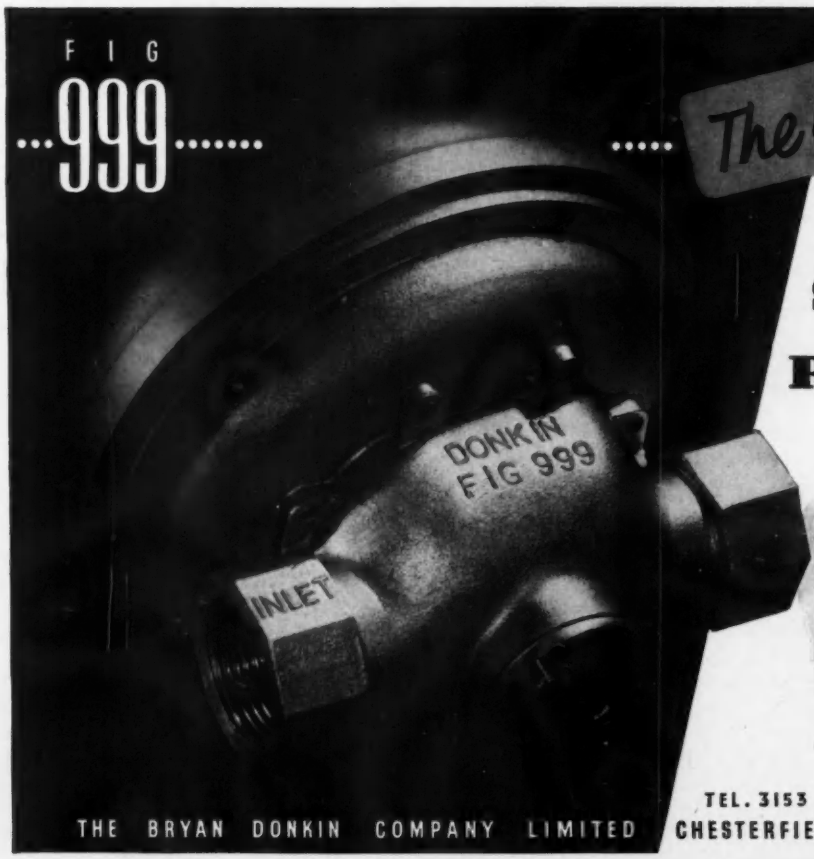


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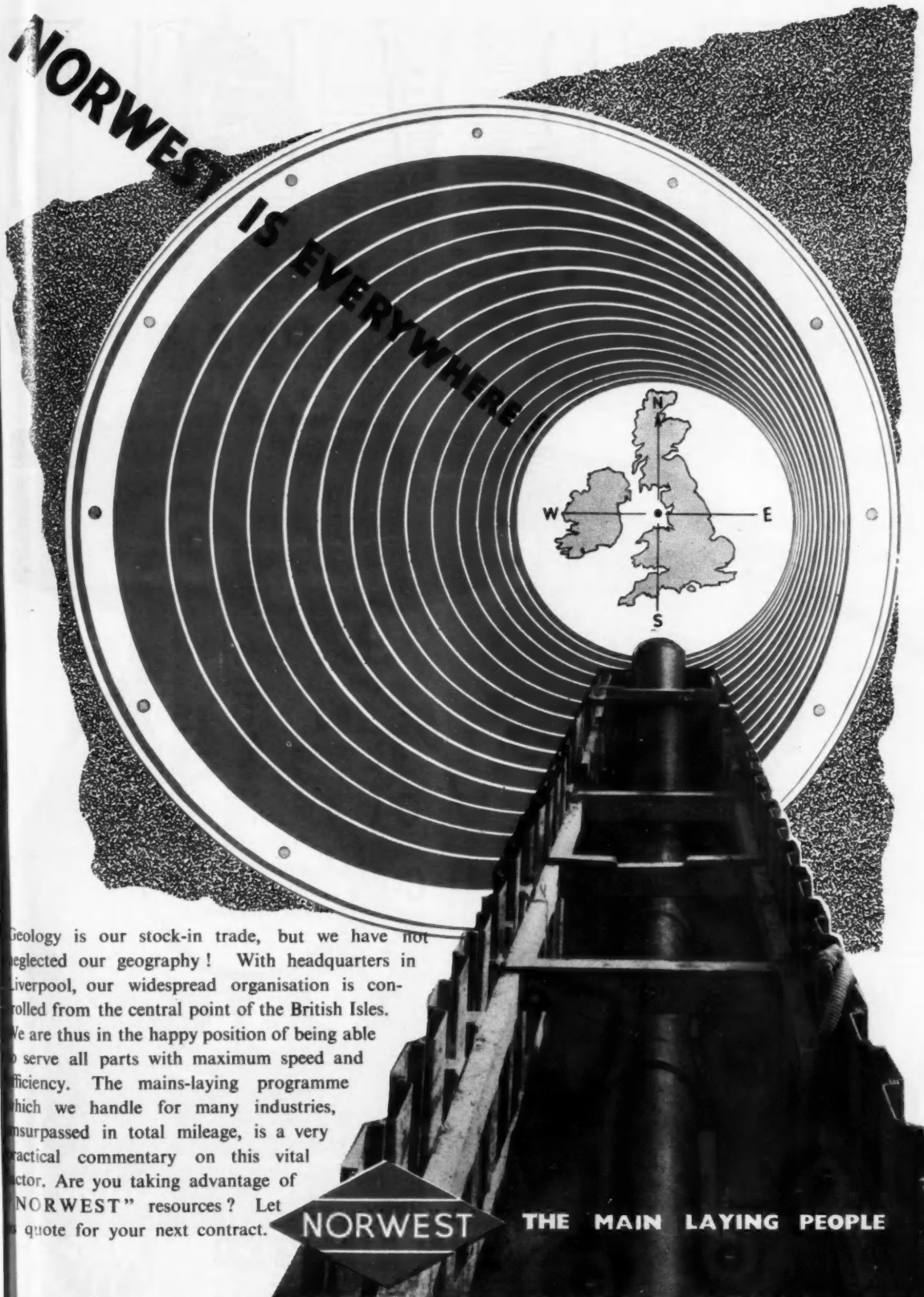


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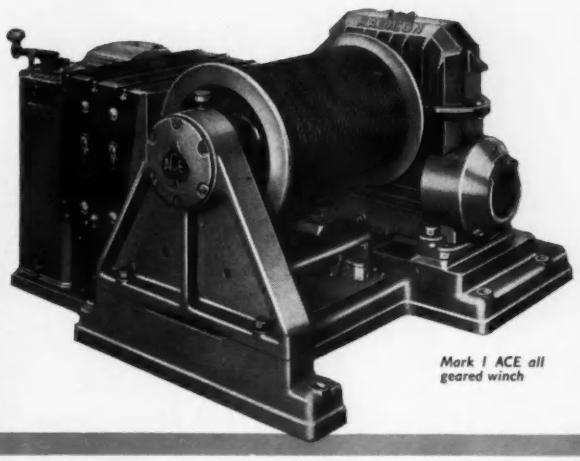

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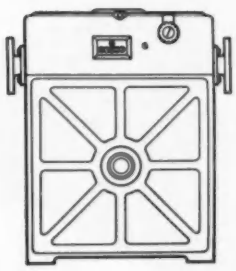

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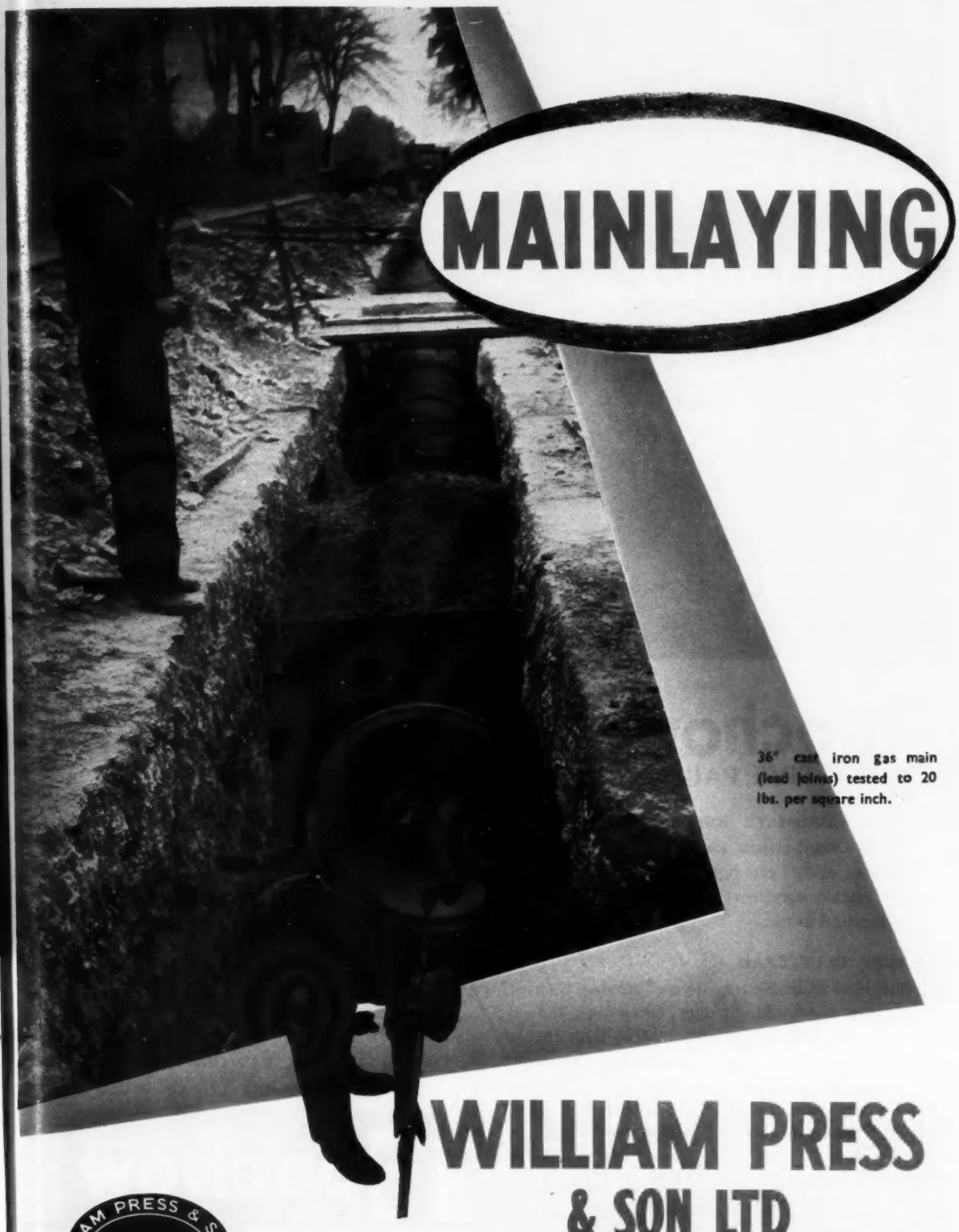

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*Photograph of the 'Mushroom' caused by the Atom Bomb explosion at Bikini, 1949*

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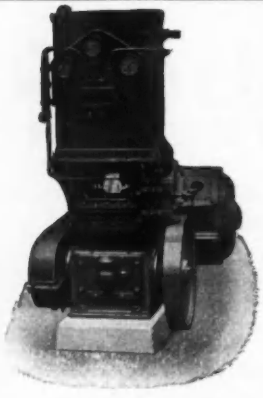

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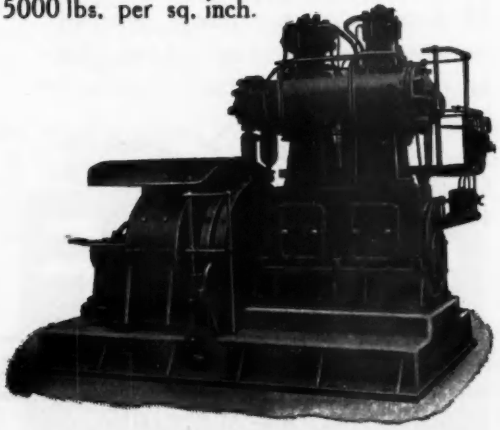

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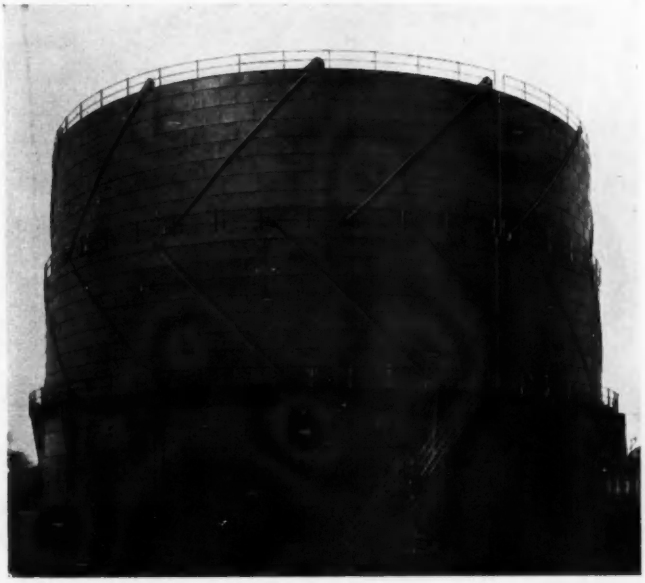

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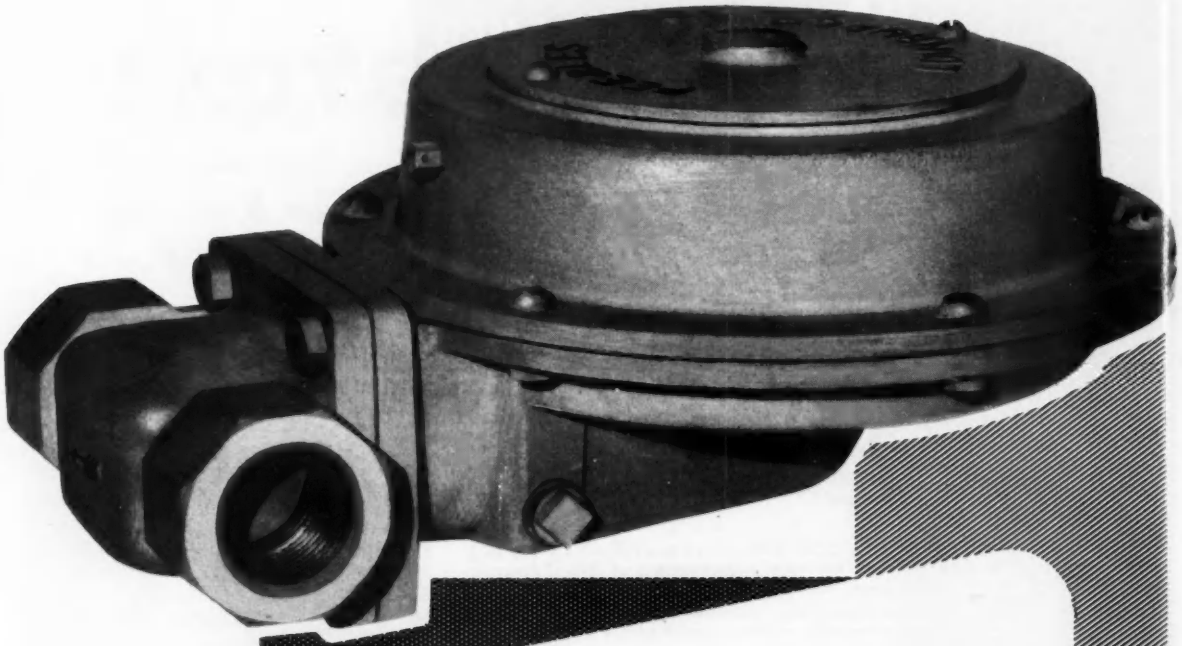

*The Figure 103*

**HIGH PRESSURE GOVERNOR**

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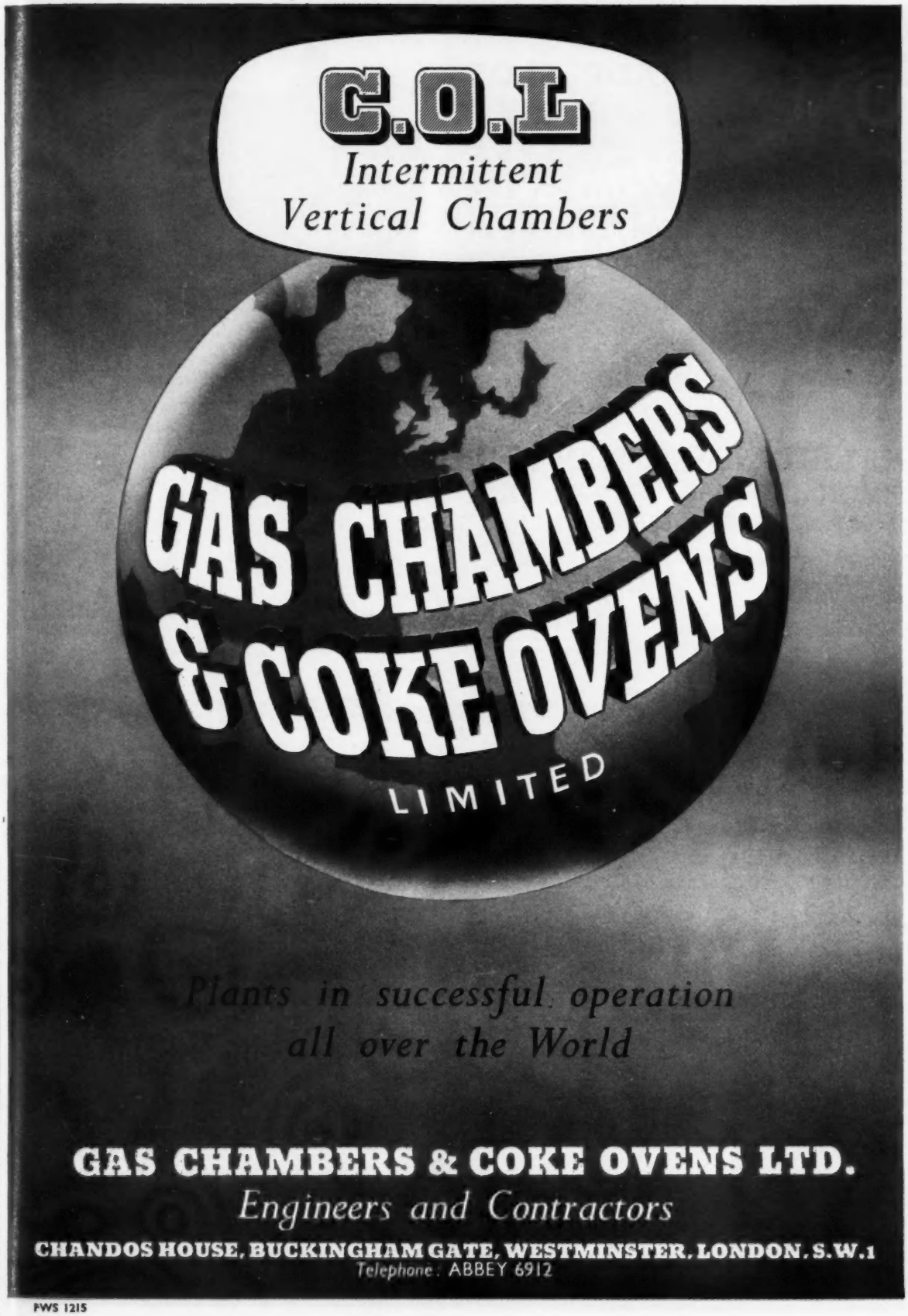
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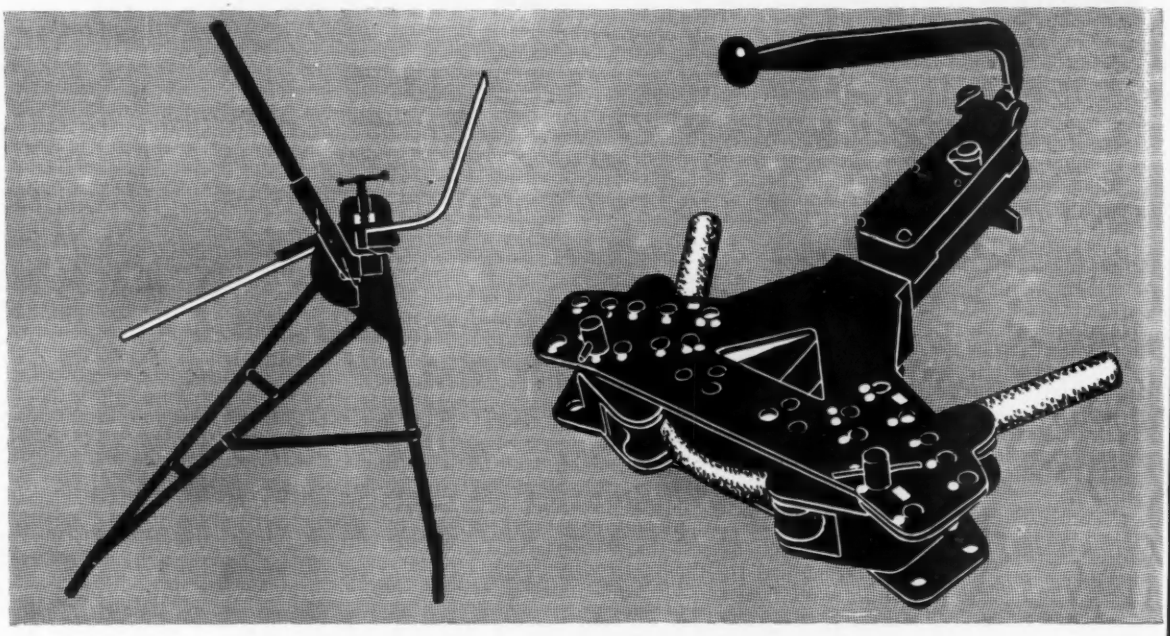

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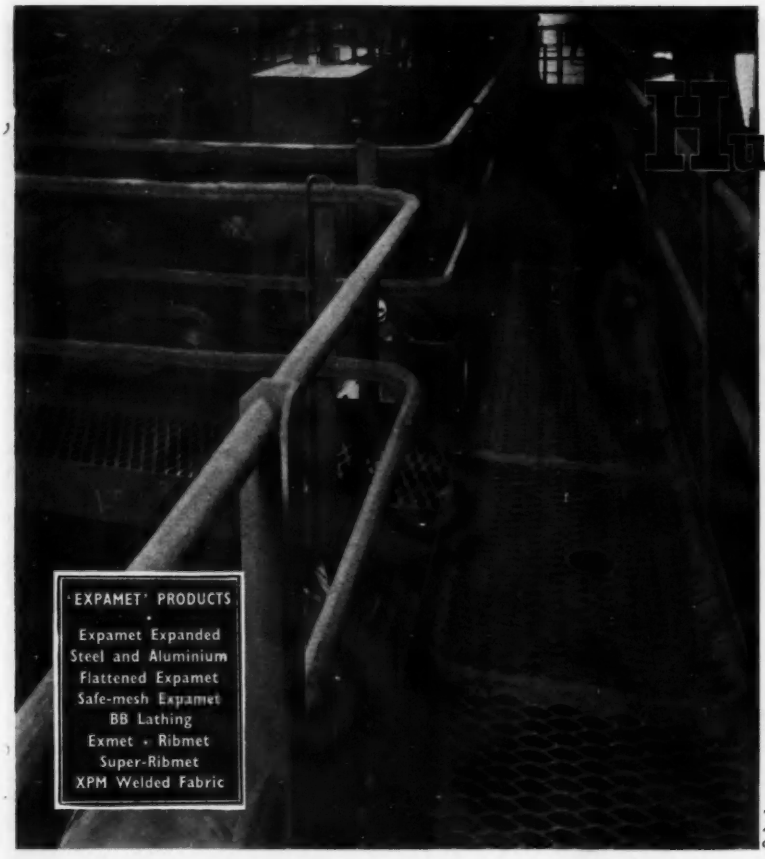


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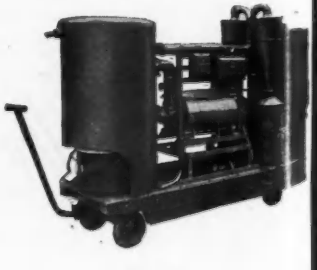

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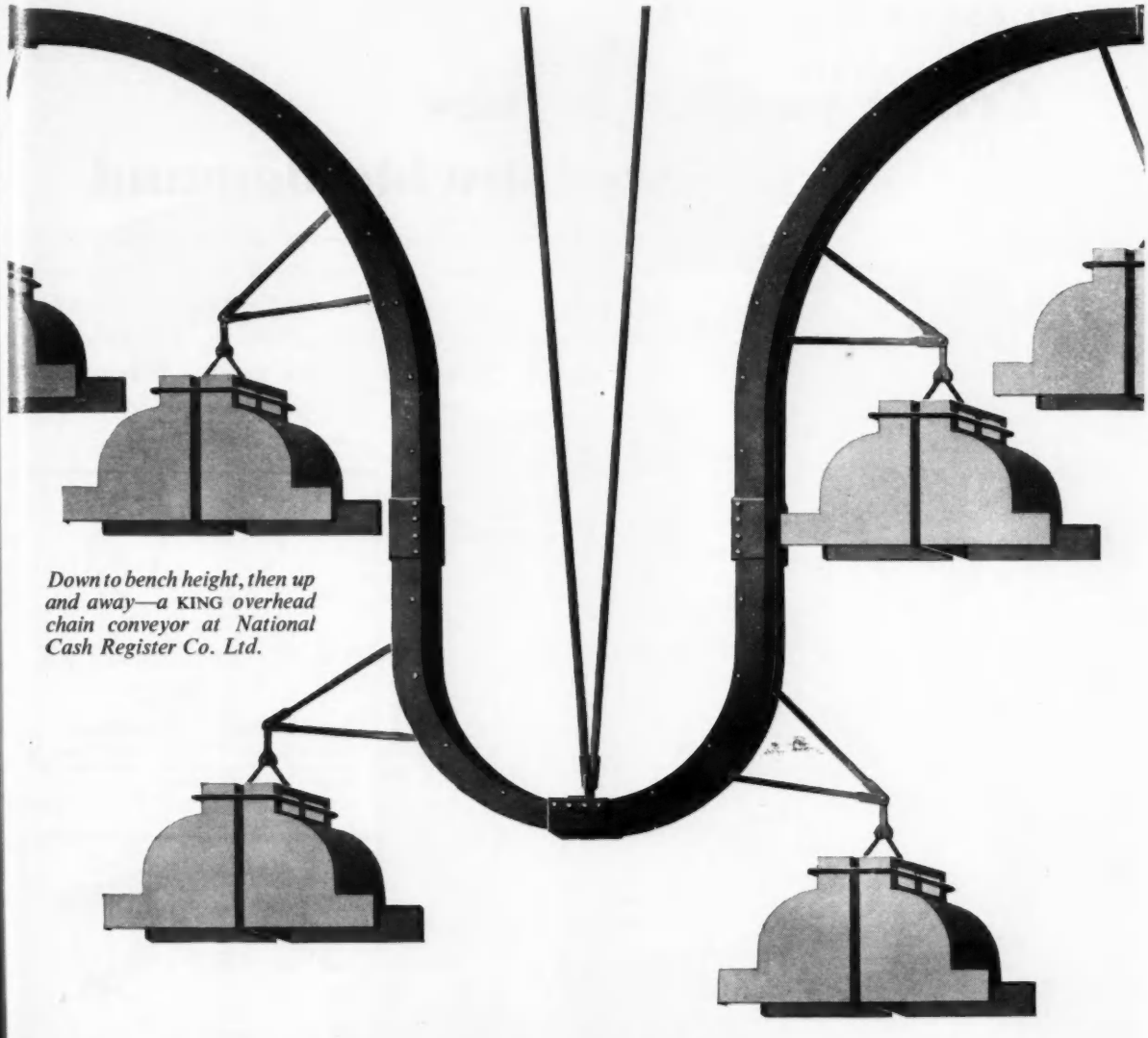

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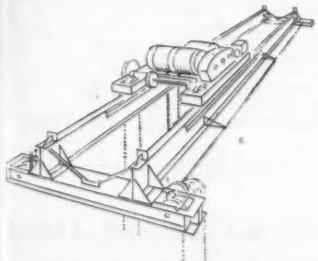
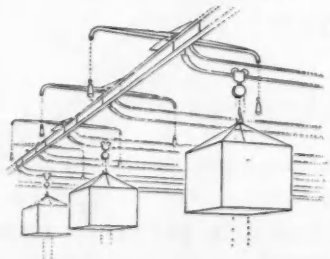


A KING OVERHEAD CRANE



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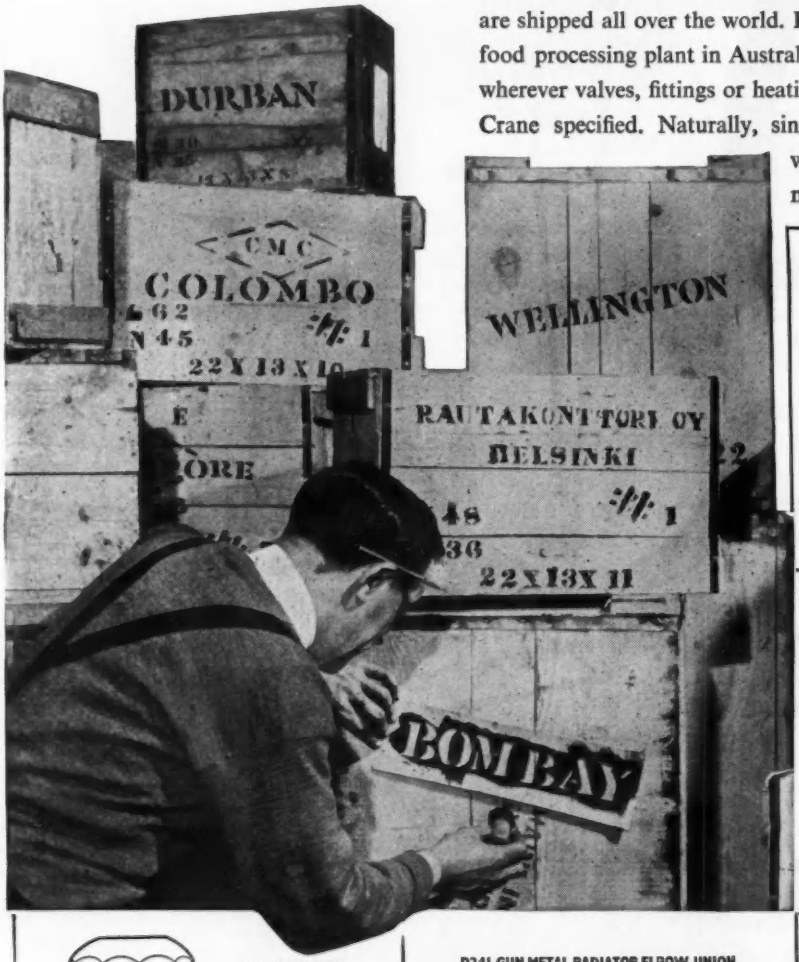


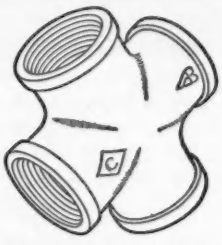

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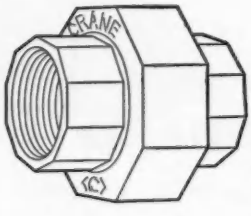


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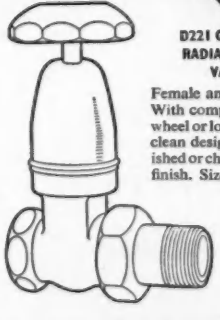

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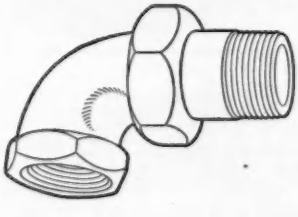

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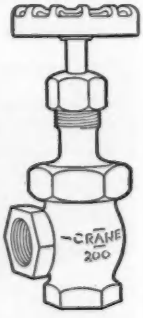


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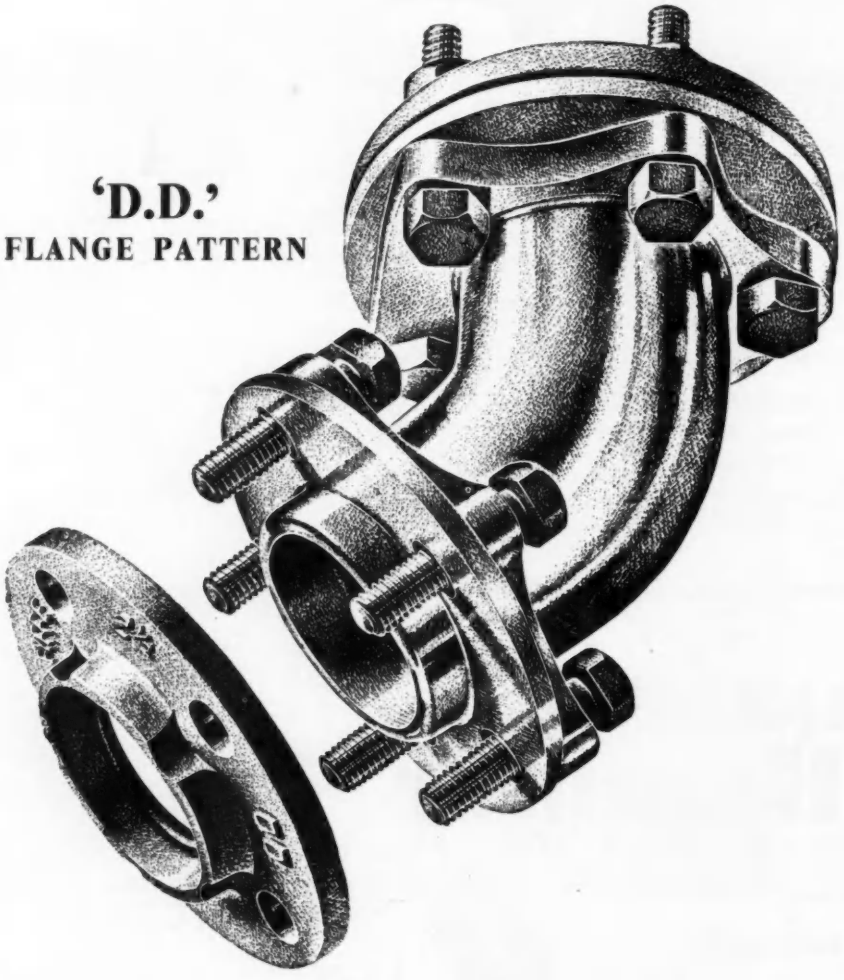

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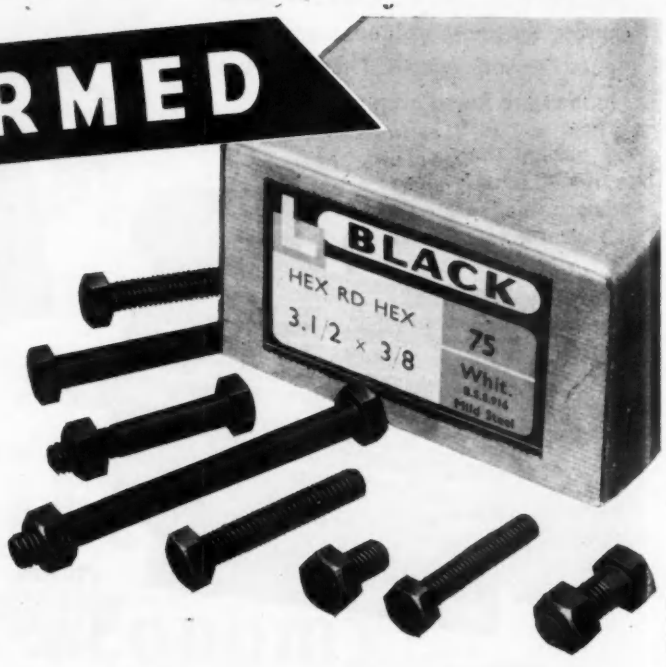


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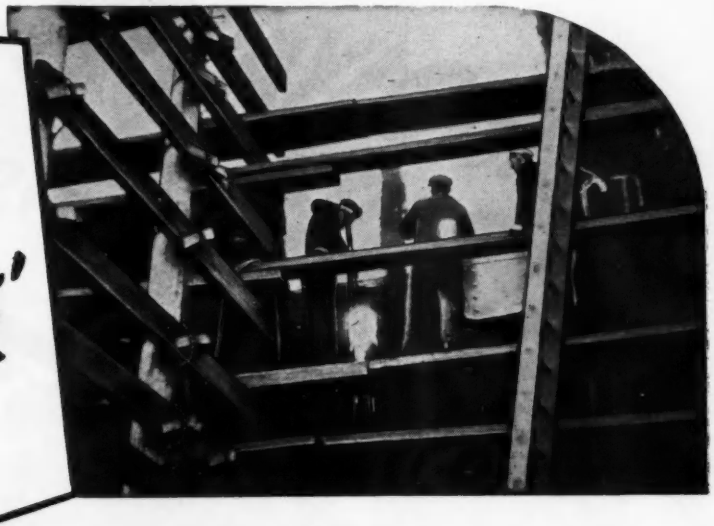

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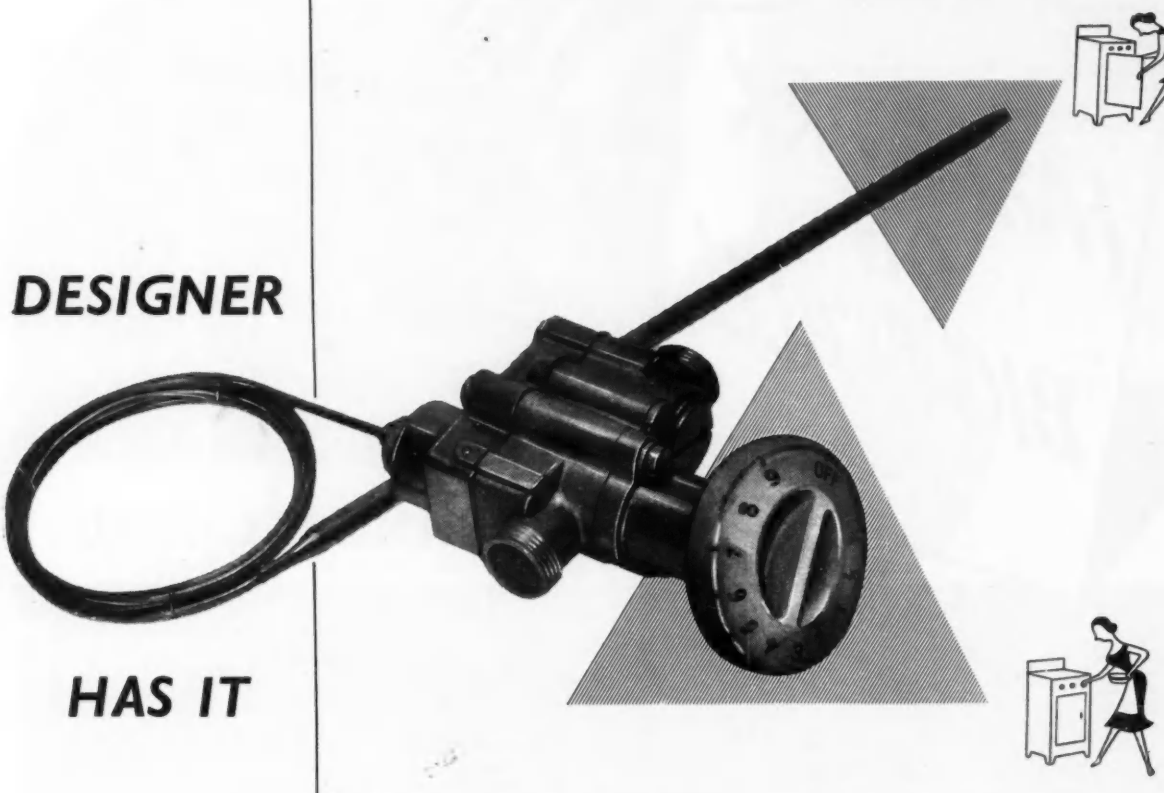

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BEGWACO

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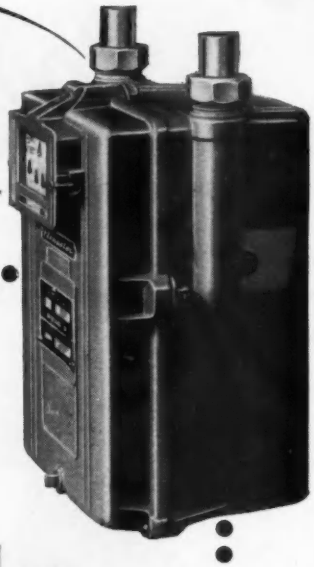

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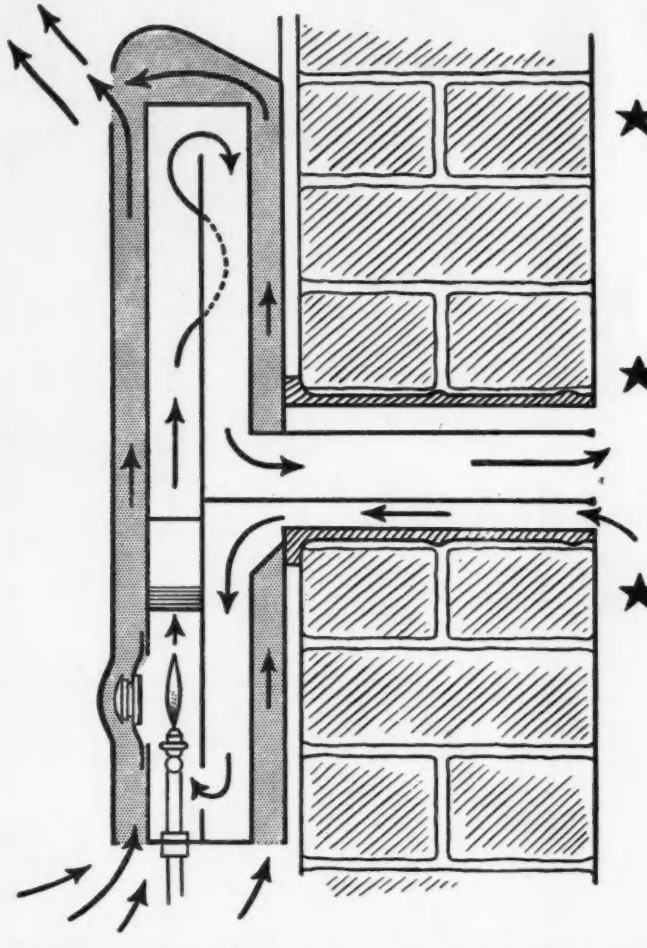

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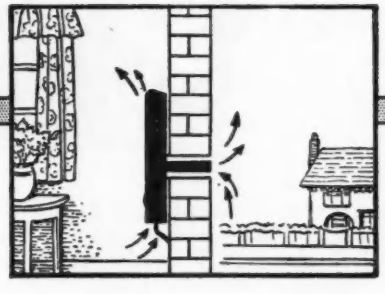

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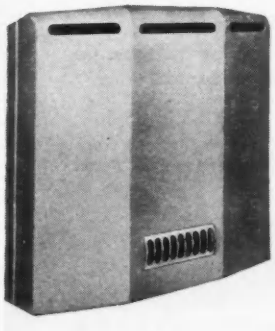

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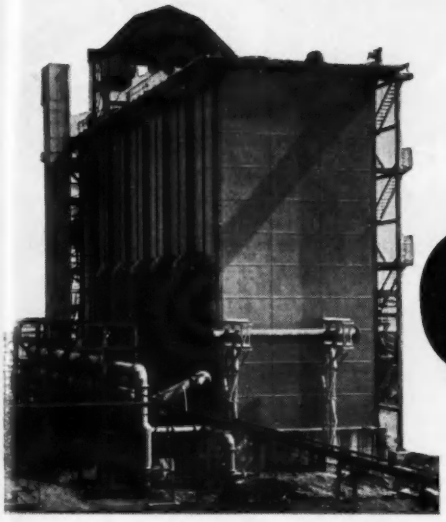

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The first large Balfour-Lecocq Tower Box Purifier was completed at Rotherham. Its capacity soon to be doubled to 20,000,000 cu. ft. per day. A second purifier of 7,500,000 cu. ft. per day nears completion at Southall. The foundations are laid for a third at Bow Common.

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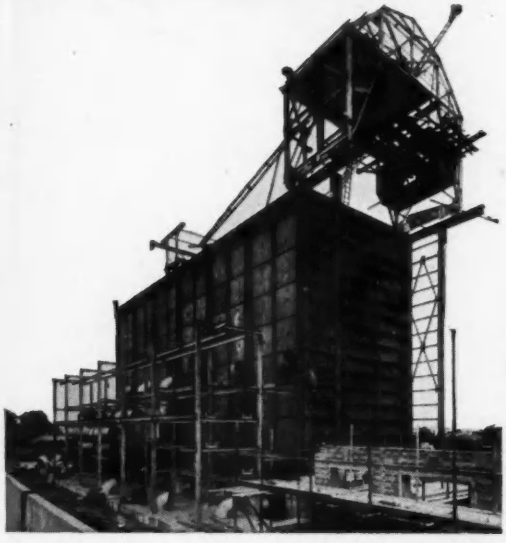
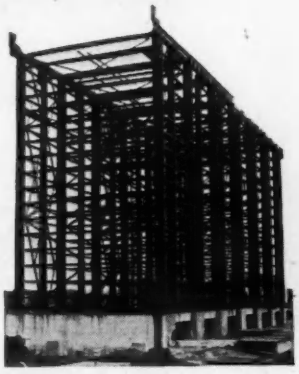


**After**

The unequalled technical resources of the Balfour organisation are at the service of those requiring detailed information on application of Tower Box purifiers or other gas equipment to their needs.



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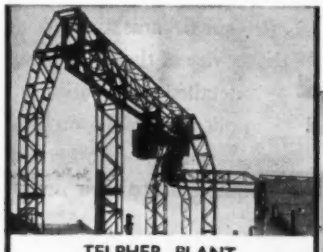

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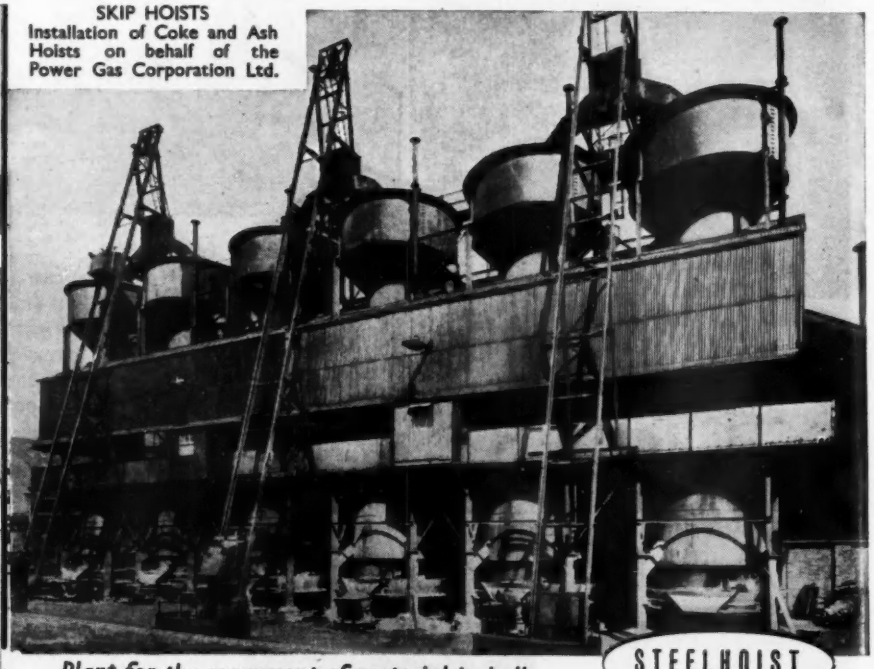

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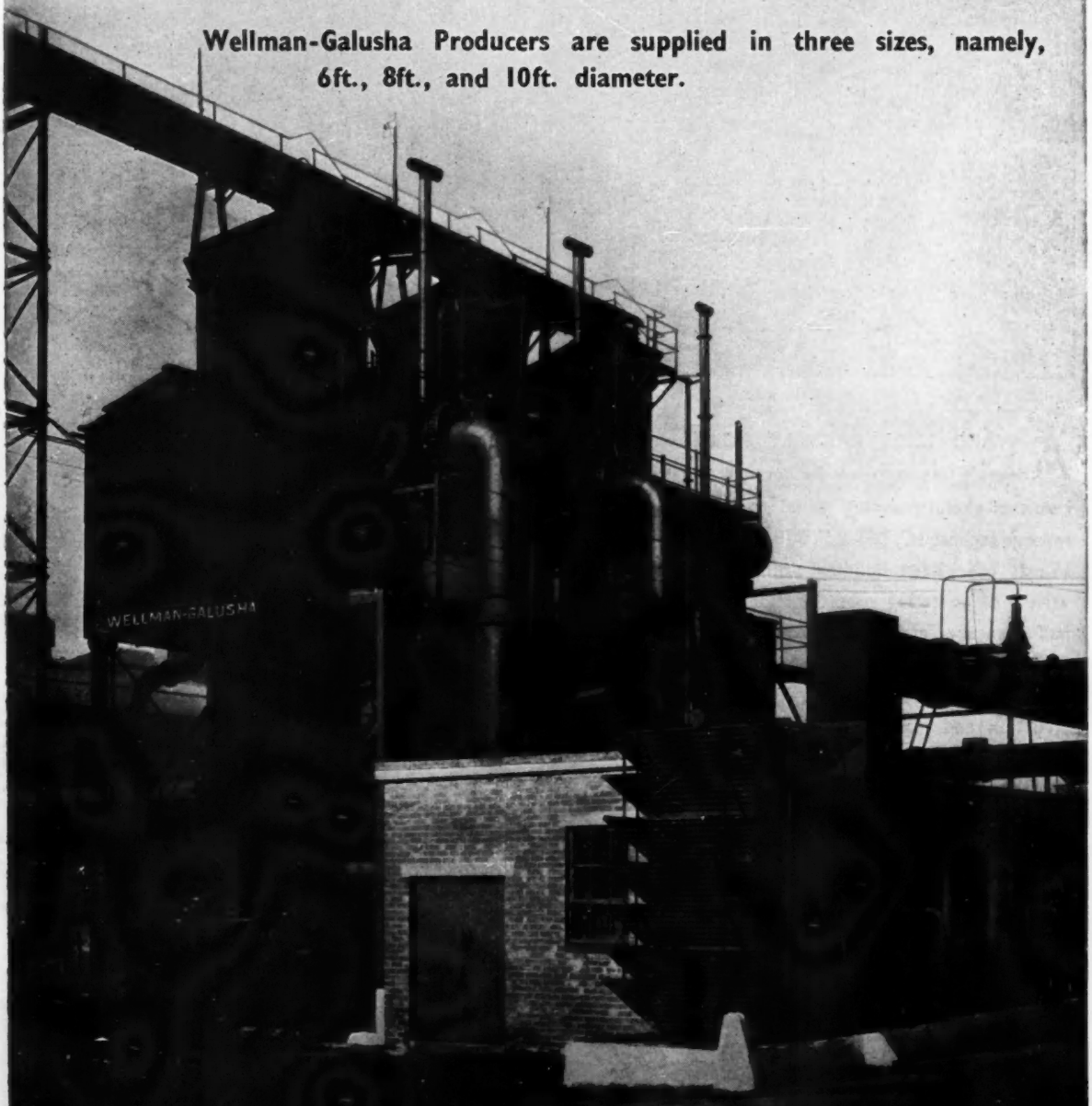


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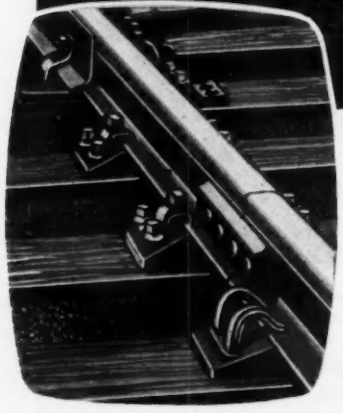

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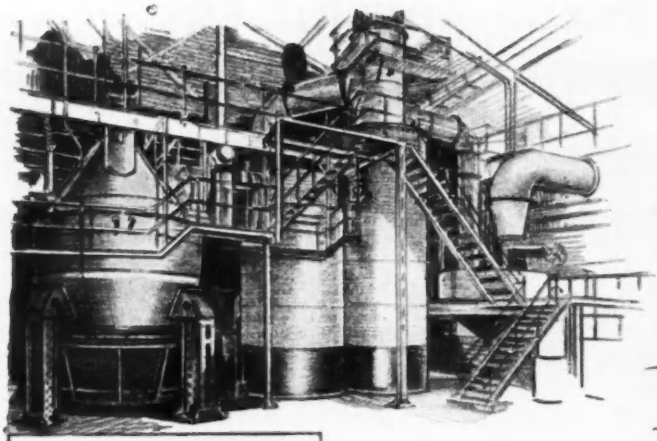

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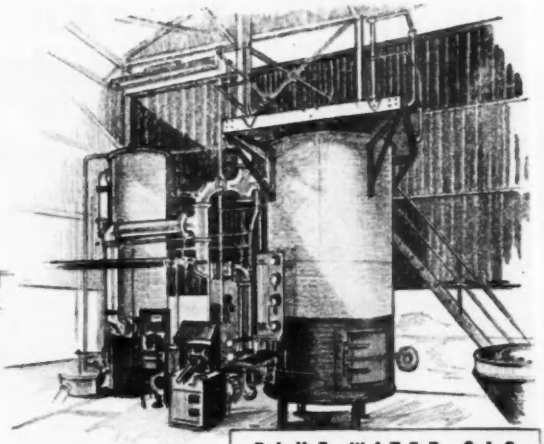

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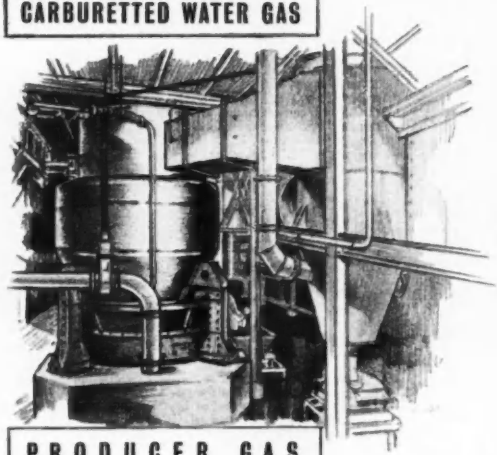

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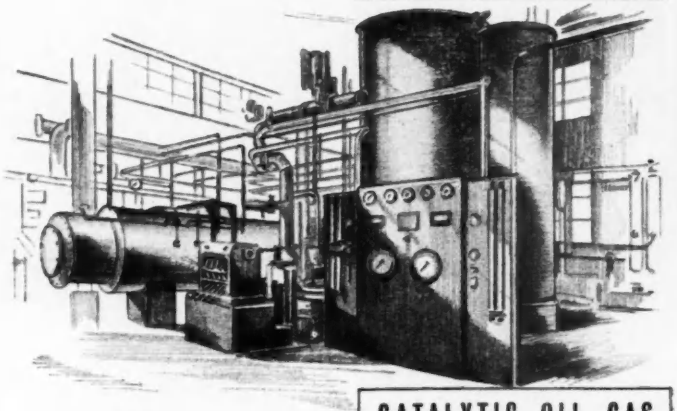

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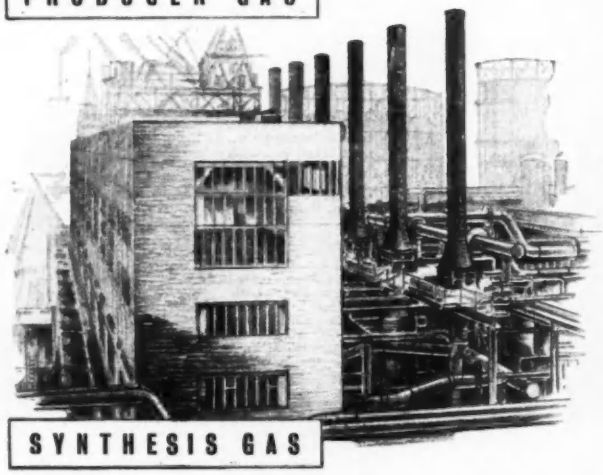

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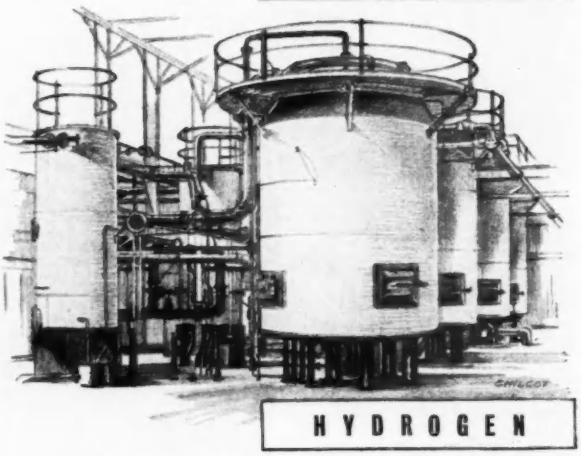

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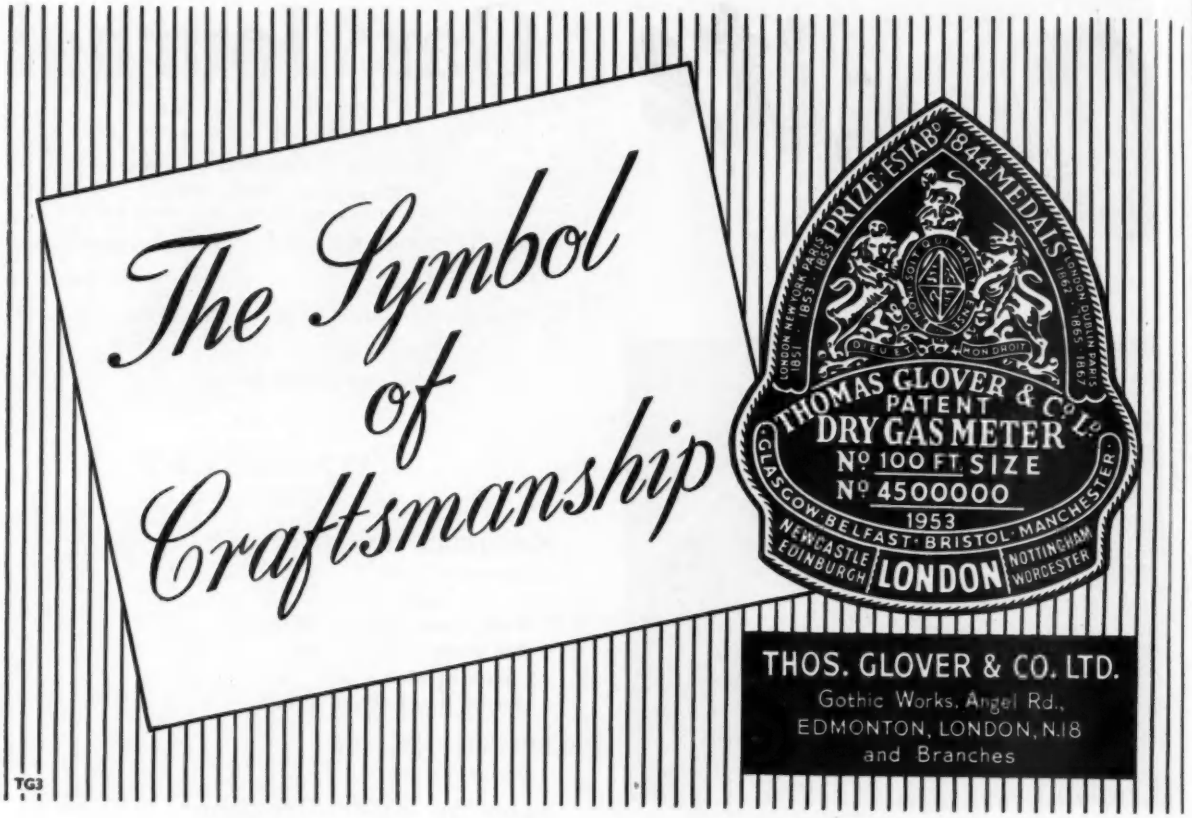


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# GAS JOURNAL

VOL. 276. No. 4720 105TH YEAR November 18, 1953

## SALESMAN'S TONIC

As we remarked a few weeks ago when describing the North Eastern Gas Board's new incentive scheme for gas salesmen, a rapid change of values is taking place in the relationship of sales staff to the rest of their colleagues in the gas board of 1953. Sales staff, for long regarded as a necessary evil, or not regarded at all, are emerging from the sharpening competition of present-day trading as people with some status, whose efforts are watched with increasing interest and anxious expectation by management. In short the gas salesman is coming into his own—and not before time. However, the benevolence with which the salesman is coming to be regarded by certain area boards is already well established in the East Midlands where the Board, even in its early days, gave evidence of the right attitude towards things commercial—staff included. It is, moreover, safe to assume that the return of the Board's Commercial Manager, Mr. H. R. Hart, from his trip to America with the productivity Team, resulted in an enlightened appreciation of the need for a carefully nurtured concerted sales effort.

We have just returned from attending the third annual conference of the Board's Sales and Service Circle, an event which was both refreshing and encouraging—refreshing because it was good to see the growing sense of camaraderie among the sales personnel of this large area; encouraging because the planning of the conference showed a desire to acquaint the delegates with new aspects of their job and give them an insight into the infinitely larger world of marketing outside the somewhat parochial confines of the gas industry. The agenda was light and far removed from certain endurance tests we have experienced in the past. It was social as much as business and it was aimed not at so stuffing the delegate that he tottered back to his undertaking suffering from mental indigestion, but at instilling in him a sense of joint endeavour, of teamwork, of confidence in the foresight of his superiors, and planting in his mind a few ideas which would provide him with food for thought.

The ideas so planted at this conference all came from outside the industry. Like the heavenly bodies whose movements affect our own planet, these ideas from outer space illuminated new places, caused little breezes of discussion to form, and subtly changed the direction of thoughts and beliefs. There were in the main three such influences. Mr. J. S. Sopel, of Marks and Spencer, Ltd., spoke on 'Selling from a Store,' a polished, concise address which revealed the machinery of selling in a strange and awesomely clinical light. Mr. D. R. Griffiths, Director of the Incorporated Sales Managers' Association, who generated much heat beneath collars at the first Gas Service Conference at Seymour Hall by claiming that a competent gas salesman could be trained in three months, posed the provocative question 'Are Salesmen Really Necessary?' and, very naturally in the circumstances, decided that they were. The third stimulus was the showing of two sales training films, one English and one American, which indicated just how effective this medium can be for such purposes, and how valuable a good *gas* sales training film would be. We commend the idea to the Gas Council.

The determination to give the salesman new horizons is unquestionably one of the benefits of nationalisation. It is an outlook which did not exist before—in fact, it could not—and, together with the greater opportunities for promotion, it does much to compensate the salesman for some of the things he lost when his job became one of the 'affairs of state.' (There are those who might seek to deny that the salesman lost anything by nationalisation, but they are likely to be either people who achieved a somewhat unnaturally rapid elevation as a result of a reshuffle, or people who know nothing about salesmen anyway.)

The conference was held under the very able chairmanship of Mr. Sydney Smith, the Chairman of the Board, who in the course of his opening remarks said this: 'In every direction it is plain to see the relaxation of the restrictions which were the legacy of war and of the nation's pressing economic needs; and, as a consequence, we are witnessing the return of a period of greater opportunity for enterprise and initiative. Our greatest concern, during the major period of our existence as a Board, has been with the pressing problem of meeting a steadily increasing demand for gas. We are far from being in a position to say that this has now ceased to be a problem, but now that the plans which have occupied so much of our time and effort are being put into effect, we do feel that the problem is becoming easier. In the future we shall need to direct our attention more and more to expanding our business and to marketing our products in a difficult period of intensifying competition. This, I am certain, is not a thought which will fill you with dismay. On the contrary, I am confident that you will find inspiration in the realisation that the salesman is to become, more than ever before, a vital member of our organisation.' He went on to describe the commercial set-up of the Board, which now boasts a team of experts specialising in marketing,

display, and so on, and to comment on the Board's new salesmen's bulletin *Talking Shop* and the forthcoming dealership scheme.

From all this it should be clear that in the East Midlands selling is taken very seriously and is the subject of much careful research, thought, and long-term planning. These facts were epitomised in a conference which we found as refreshing and stimulating as it was enjoyable.

## A NEW ANGLE

It is sometimes salutary to look at a familiar subject from a new angle. We in Great Britain have been accustomed, or at least some of us, so long to look at our coal reserves as a dwindling asset of immense value to be conserved as long as possible by careful use and strict economy. But it is clear that some people look at it as an inexhaustible commodity to be marketed as quickly as possible at a good profit while the going is good. They look upon it as a competitor fighting for its place in the energy market with such formidable rivals as oil, natural gas, and hydro-electric power. At least that is the impression one gets from the remarkable editorial, 'Coal Comparisons,' in a recent issue of *The Times*.

This competition has coincided with a growing economy in the use of energy, as if such economy was something to be deplored. 'The result has been to check the expansion of demand for coal.' The trend in America is seen as a decline in the commanding position of coal in an economy where the use of energy had risen by three-fifths between 1925 and 1950, 'whereas coal provided nine-tenths of this energy in 1900, it only provided two-thirds by 1950, and one-third by 1952.' On the other hand, oil provided two-fifths by 1952 and natural gas one-fifth. Hydro-electric power accounted for no more than one-twentieth. Coal consumption dropped from 600 mill. tons a year in the 20's to 450 mill. tons in 1952. From this new angle this looks like a disaster, especially as it has been accompanied by a 50% reduction in the number of miners and by a formidable rise in miners' wages, to a level far in advance of those in other industries. Average daily earnings in 1952 were about £7 a day, but of course we must remember that these earnings were paid in dollars in a dollar economy and not in pounds sterling. Let us here indulge in a little rough arithmetic. At the rate of the 20's it would have taken 667 mill. tons of coal to provide all the energy needed. By 1952 it was taking 450 mill. to provide one-third of one-and-three-fifths as much energy. We make it that at the same rate it would be taking 850 mill. to provide the same amount of energy as required in the 20's—a tremendous increase in the coal-cost of the energy still produced by the burning of coal—to be explained no doubt by the fact that oil and natural gas had skimmed off the more efficient fractions of the load.

And so the story goes on. Coal is losing its place in the railways of the U.S.A., where the diesel loco has displaced steam. We know, in the gas industry, how natural gas has nearly completely ousted gas distilled from coal. 'Some observers think,' according to *The Times* leader writer, 'that within the next 25 years the cost of getting coal may rise less than the cost of getting oil and natural gas.' No one seems to have told him that possibly oil and natural gas may within that period be getting pretty scarce, and that, to quote the Anglo-American Productivity Team on Fuel Conservation, in spite of the rapid expansion of the oil and natural gas industries, coal remains the largest and most valuable of the total mineral wealth of the U.S.A.; adding 'In fact, United States coal deposits represent about 40% of the world's known total.' In the meantime the U.S.A. is saving 150 mill. tons of coal a year.

The article goes on to a consideration of the coal position of Europe as a whole. Slowness in post-war recovery is seen as due in great degree to a shortage of capital, even in Great Britain, for re-equipment of mines, for investment and research. Truly, a new angle. There may be something in it, but we shall take a lot of convincing that it is not wise to reduce rather than expand the annual consumption of coal, not by reducing the production of energy but by reducing the coal-cost of energy. We in Britain may one day be compelled to purchase American coal to keep our industries going. When we do, our industrial life will be drawing to a close. Our industrial independence will last just as long as our coal reserves, unless of course there is some fundamental revolution in the technique of energy production. We know far more about the economical use of coal than we are likely to put into practice. What we need is capital for the implementation of known techniques in the saving of coal.

We turn for a moment to the recent speech in New York of Sir Christopher Hilton, deputy controller of the atomic energy production department at the Ministry of Supply, who has been in Washington with Lord Cherwell and Sir John Cockcroft for an exchange of views with American experts. Without beating about the bush, he said that the British Atomic Energy Organisation hoped within the next few years to be supplying to the electric grid system power generated at an atomic station. And he added that a cost analysis indicated that the price of electricity generated in this way could be competitive. Present estimates showed that it should be possible to generate electricity from gas-cooled thermal reactors at a price not greatly in excess of the cost of generation in a modern orthodox power station. He foresaw the time when cheap atomic energy would substitute diminishing coal supplies.

The whole problem has, of course, a bearing on the future of the gas industry. That is why we refer, very briefly, to the atomic station mentioned by Sir Christopher Hilton. This is now being constructed at Calder Hall, Cumberland. The reactor core is to be enclosed in a mild steel shell within a biological shield, boilers being arranged round it to supply steam to turbo-alternator plant of conventional design. 'We hope,' he said, 'to be generating electricity for the grid within the next few years, and we then believe that it may be possible to suggest to the British Electricity Authority that it should build additional reactors of this type, having them designed and constructed by the power plant industry of the country.' Coal is a wasting asset and steadily becomes more costly in real terms to extract, and it may well prove that cost comparisons will gradually turn in nuclear energy's favour. There remains the possibility—and this has been emphasised in many quarters—that power will not be available on a large scale until new processes are introduced. The efficiency of the thermal reactors such as that being installed in Cumberland may be limited. Greater

efficiency may be achieved by fast reactors—'breeder reactors. The thermal reactor can be dangerous in certain circumstances; the 'breeder' reactor, the type for which a remote site is now being sought in Scotland, can be dangerous in any circumstances. There is indeed room for apprehension.

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### *WAGE CLAIM GOES TO ARBITRATION*

For the first time in its history the gas industry is to have recourse to the machinery of arbitration for adjudication on a wage claim from its manual workers. The National Joint Industrial Council for the Gas Industry has been considering a claim for an increase of wages from the trade union side, and after an adjourned meeting on November 9 a statement was issued to the effect that the Council had failed to reach agreement and that, accordingly, the claim was being referred to arbitration. The claim affects between 95,000 and 100,000 workers in the industry and was submitted by the National Union of General and Municipal Workers, the Transport and General Workers' Union, and the National Union of Enginemen, Firemen, and Electrical Workers—the three largest unions represented on the National Joint Council. No statement has been made as to the amount of increase sought, but it has been stated in the daily Press that the claim represents something like 1½d. per hour.

The last rise granted to the manual workers took effect from September, 1952, and amounted to 2d. per hour, bringing the basic rates up to 3s. 1d. per hour in London, 2s. 10½d. in 'Provincial A,' and 2s. 8½d. in 'Provincial B.' At that time it was stated that the direct cost to the industry of an increase in the wages of manual workers—excluding any consequential effects on other scales—works out at something like £1 mill. per annum for every rise of 1d. per hour. Both sides are pledged to accept the result of the arbitration.

### *HOT WATER WITHOUT TEARS*

'Grime Does Not Pay' was the title of the talk on hot water given by Mr. R. J. Gregg, Publicity Manager of the Gas Council, at the Ninth Branch Conference of the Women's Gas Federation on November 10. The title, as the speaker admitted, was corny, but the substance of the talk, beneath the veneer of engaging drollery, was obviously regarded by the audience as being fresh and interesting. The *pot-pourri* of historical fact concerning the countless millions of great unwashed since the dawn of time gave ample scope for a breezy and at times somewhat Rabelaisian dissertation, but we were glad to note that Mr. Gregg's frivolity became less marked when he dealt with the figures relating to water services, both hot and cold, in British homes today. No attempt at comedy could render these figures anything but tragic and alarming. How strange that so few people, comparatively speaking, are concerned about the absence of any hot water service in a substantial proportion of our houses. If national indignation could be sufficiently stirred the demand for water heaters would be phenomenal. Mr. Gregg is predominantly a salesman, and he is not ashamed of it. If he succeeded in selling the idea of hot water for all to the 300 delegates present at this meeting he will have laid a further brick in the great structure of public indignation which is the only solution to a serious and shameful national problem—and perhaps the only key to this valuable but still relatively undeveloped gas load.

### *UNITED FRONT*

An almost unique collaboration between gas, electricity and solid fuel has resulted in the publication of a 'popular' booklet on insulation which will be distributed free to the public through gas and electricity showrooms and by authorised appliance distributors of the Coal Utilisation Council. As the Hon. L. W. Joynson-Hicks, Parliamentary Secretary to the Ministry of Fuel and Power, explained when the new publication was launched at the Building Centre on November 12, the booklet appears in answer to one of the 40 recommendations of the Ridley Committee—number 13 to be precise—and it indicates the extent to which fuel can be saved and comfort conditions increased by ensuring that simple insulation is carried out in the domestic home. In this country, he said, we are singularly behindhand—certainly far behind the Americans and the Eskimos—in our knowledge of how to keep warm. We apparently prefer to stick to old fashioned methods and allow a large proportion of the heat which we provide, at considerable expense, to disappear through the roofs of our homes; although Mr. Joynson-Hicks commented that the new houses being provided for the coal industry have a very high standard of insulation. The booklet itself is a minor miracle, not only because it is the outcome of joint consultation between the Gas Council, the British Electrical Development Association, and the Coal Utilisation Council, all representatives of highly competitive industries, but because instead of being the anaemic remains of much bloody skirmishing, it is bright, interesting, and above all, funny. This point was commented on by Sir Alfred Hurst, who clearly regarded it as being remarkable indeed. We could not agree more. If three rather over-serious industries can somewhow kindle humour in their joint endeavours, can we not have more of them? Heaven knows, they can be dull enough on their own, and insulation is not the only subject on which the three nationalised fuel industries can join forces with advantage to themselves and to us all.

### *HUMAN RELATIONSHIPS IN ENGINEERING*

There is no need to stress the importance of the craftsman. As recalled by Mr. A. Roebuck in his Presidential Address to the Institution of Mechanical Engineers, when Jerusalem was captured by the Babylonians one of their first acts was to carry the smiths and craftsmen as captives to Babylon, thus rendering the enemy comparatively harmless. In Anglo-Saxon times the smith was treated as a man of the highest rank. A point of major importance made by Mr. Roebuck was that in the field of engineering no one group is 'better' than another. Whether as professional engineers, as technicians, or as craftsmen, each is vital to the success of all, each has a unique contribution to make, and the ideal is that each person should be free to develop his particular aptitudes and qualities so that he gives the very best of which he is capable. There is no doubt that the engineering industry—and the gas industry is part of it—is well placed to set an example in achieving good human relationships. One can quickly establish the right relationship with a man by an approach to him on the level of his technical abilities and aptitudes. He takes pride in these abilities and aptitudes, and his self respect is to a great extent based on them. 'This,' said Mr. Roebuck, 'is a much firmer ground for a real relationship than economics or social outlook. Where employees, managers, and men can approach each other on this basis I do not think there need be great worry about industrial co-operation.' Appropriately, the President paid tribute to the important part that the City and Guilds of London Institute has played for so many years in developing the theme of co-operation and understanding between the professional man and the craftsman. And certainly Britain owes much to the London Livery Companies and to the Committee whose inspired foresight at the Mansion House meeting in 1876 showed that they recognised so clearly that all industrial effort depends on a just appreciation of the balance of scientific knowledge, æsthetic principles, and craft skill.

# Personal Notes

DAME VERA LAUGHTON MATHEWS, Adviser on Women's Affairs to the Gas Council and part-time member of the South Eastern Gas Board, has been elected Life President of the Association of W.R.N.S. in place of the late Dame Katharine Furse.

MR. R. H. ENGLAND, Hillside Cottage, Redhill, Wrington, Bristol, has been appointed by Graphite Products, Ltd., manufacturers of Foliac products, as Sales Representative for the South West area of England. Mr. England has been closely connected with the engineering industry over the past 18 years.

MR. H. MCNEIL, Director and General Manager of Babcock & Wilcox, Ltd., has been appointed Deputy Managing Director, and MR. J. STEWART ROBERTSON, Assistant General Manager, has been appointed General Manager. Mr. McNeil was born and educated in New Zealand, and came to England early in 1931, when he joined Babcock & Wilcox, Ltd. After serving as deputy chief engineer and subsequently General Manager, he was elected to the Board in 1950. Mr. Robertson served his apprenticeship in engineering with the General Electric Co., Ltd., joining Babcock & Wilcox, Ltd., in 1935. He represented the company in New York from 1946 until 1950, when he returned to the United Kingdom, and was appointed manager of the Commonwealth sales department at head office. He was appointed Assistant General Manager last December.

MR. F. A. C. PYKETT has retired from the position of Divisional Distribution Engineer, Warwickshire Division, West Midlands Gas Board. Many young men now in control of distribution have at some time been associated with him either at Halifax, Lancaster, or Coventry. Mr. Pykett started his career with the late Mr. F. D. Richmond at the Heckmondwike and Liversedge Gas Company and after six years apprenticeship went to Halifax for a period of 12 years with the late Mr. W. M. McLusky. Appointed distribution superintendent at Lancaster with the late Mr. George Dixon, he went to Coventry in 1927 as distribution engineer with Mr. P. N. Langford. Up to nationalisation he was responsible for the whole of the distribution of gas at Coventry embracing mains, services, industrial supplies, maintenance, public lighting, showrooms, sales, and publicity. His membership with Junior Associations extends over 43 years, having been elected a member of the Yorkshire Juniors in 1910 and serving as Secretary from 1920 to 1925. Later he transferred to the Manchester and District Association while at Lancaster and then to the Midland Association when he moved to Coventry. The Midland Association recently elected him an Hon. Member. He was President in 1932-33 and Chairman of the Midlands Sales Circle in 1945. He obtained the Melbourne Medal in 1938-39. Presentations have been made by the sales directors and representatives of the many manufacturers he has been associated with, the divisional distribution engineers of the West Midlands Gas Board, the divisional and Coventry District staffs, the workmen of the Coventry distribution department, and the canteen staff of the Coventry undertaking. Mr. and Mrs. Pykett will move to Thornton-Cleveleys, Lancs., early in the New Year.

MR. W. C. BELL, of Stewarts and Lloyds, Ltd., has been awarded the American Iron and Steel Institute Medal for 1953 for a paper entitled 'A Review of European Operating and Technical Practices' which he delivered in New York in May. There are no restrictions regarding the nationality of the recipient, but this is the first occasion on which the medal has been given to anyone other than a citizen of the United States. Mr. Bell is now a local Director of Stewarts and Lloyds, Ltd., and joint Director in charge of research and technical development, including planning and new construction of iron and steel works throughout the company.

MAJOR ALEX. BUJNOWSKI, M.C., O.ST.J., Sales and Publicity Officer, Glasgow District, has been appointed Sales and Service Superintendent to the Scottish Gas Board, Glasgow, as from November 1. Mr. Bujnowski has been Secretary of the Scottish Gas Development Centre since its inception in 1943, during which time he has advised Scottish undertakings on industrial and domestic utilisation of town gas. He has served on the Industrial Gas Development Committee of the Gas Council and the Editing Sub-Committee, and is Chairman of the Exhibitions Sub-Committee. Among the organisations of which Mr. Bujnowski is a member are the Gas Industry Standards Committee, the Institute of Fuel, the Scottish Junior Gas Association (past President) and the National Smoke Abatement Society. He has published numerous papers, especially on the use of gas in industry. Since 1937 he has held the Senior Lectureship in Gas Supply at the Royal Technical College, Glasgow, and was a member of the board of examiners of the Institution of Gas Engineers from 1946-49. An examiner for the Institution of Gas Engineers for gas sales technology, he is also a member of the Education Committee of the Incorporated Sales Managers' Association. In 1946 he was appointed by the Ministry of Fuel and Power and the I.G.E. as the leader of the team of investigators which examined German gas installations. Major Bujnowski was severely wounded and awarded the Military Cross while serving with the Seaforth Highlanders in the 1914-18 war. In the last war he was second in command of the 6th Bn., Glasgow Corporation Home Guard.

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**During the Period** of the Kirkcaldy Traders' Exhibiition, the Kirkcaldy District of the Scottish Gas Board took part in three ways. It had a stand in the main hall of the exhibition; it had the use of R. and A. Main's travelling showroom sited outside the main hall and it also gave three cookery demonstrations in a nearby institute. The total attendance at the exhibition was approximately 21,600, most of whom passed through the travelling showroom in addition to attending the stand in the main hall. Interest was shown in the operating model gasworks, while a considerable amount of business was done chiefly in cookers and water heaters in the travelling showroom.

# Obituary

MR. J. S. THORMAN, a former Deputy Chief Engineer of the Gas Light and Coke Company, has died at Westgate, Kent, after a long illness. Mr. Thorman entered the service of the late West Ham Gas Company in August, 1896, as a pupil of his father, who was engineer of that company. His grandfather had been the first engineer of the same company. After serving at Stratford he was transferred to Beckton and, in November, 1913, was appointed senior assistant engineer there. In 1918, Mr. Thorman became deputy resident engineer at Beckton; three years later he went to Bow Common as station engineer. Later, at Stratford, Mr. Thorman did a considerable amount of pioneer work in connection with the application of waste heat boilers to retort settings.

He was transferred to Southall—the largest of the late Brentford Gas Company's manufacturing stations—on the amalgamation of the two companies. During his period of service at Southall a great deal of reconstruction was undertaken, including the installation of a large unit of intermittent vertical chambers—a type of plant then new to the company, and almost to the gas industry in this country. Mr. Thorman was closely identified with the use of this unit to the best advantage, having regard to British carbonising conditions. For some years Mr. Thorman was Chairman and Chief Examiner in Gas Engineering of the Institution of Gas Engineers Education Scheme. The Council of the Institution awarded him the Institution Gold Medal for 1931 for his paper on 'Intermittent Vertical Chambers and Coal and Coke Handling Plant at Southall,' read at the 68th annual general meeting. From Southall Mr. Thorman was transferred as station engineer to Fulham, where he remained until his appointment as Deputy Chief Engineer in 1941. He retired from the Gas Light and Coke Company in 1945.

DR. F. G. HOLMAN, O.B.E., M.R.C.S., L.R.C.P., Chief Medical Officer of the North Thames Gas Board, died on October 23. Dr. Holman, who was only 44, entered the service of the Board early in 1946. The interest he took in affairs there was by no means confined to working hours, since he was frequently seen at out-of-hours functions, and was also an active vice-president of the Capitol Club. Always in high spirits himself, he loved contact with the younger generation, taking an intense personal interest in the apprentices. He always made time, even on holiday, to spend some hours at their annual camp. With the Royal Army Medical Corps right through the war, Dr. Holman served in France and Belgium with the B.E.F., and in Madagascar, India, Persia, Iraq, Syria, Palestine, Egypt, Sicily and Italy. One of his appointments was as Assistant Director of Medical Services to 33 Military Mission, Allied Commission, Rome, and he was on Field Marshal Montgomery's H.Q. staff. He was awarded the O.B.E.

MR. HAROLD GRIMSHAW, Manager of the contracts department in the Trafford Park works of Lancashire Dynamo & Crypto, Ltd., died on November 12. He was 60 years of age. Mr. Grimshaw joined L.D.C. 42 years ago on leaving the Manchester College of Technology and served continuously in various appointments in the contracts office before becoming Manager in 1947.

# Correspondence

## SMALL COKE BOILERS

DEAR SIR,—I should like to offer a few comments on the operation of domestic boilers of the horse-shoe types having a front which enables them to work as open fires. There must be hundreds of thousands of these appliances in use. My own boiler is at least 20 years old and continues to give me first-class service in spite of the quality of the fuel which it is called upon to consume.

Let us consider for a moment the fuel bed. This is built-up at night and in the early hours of the morning maximum incandescence is reached. Then the fire begins to 'die down.' The crux of the problem is the period of maximum incandescence. It does not occur half-way between stoking. It is conditioned by depth of the fuel bed; and during this critical period clinkering may take place which may prevent overnight burning. How can we control this critical phase?

There are two important factors—the chimney-damper above the fire and the air-inlet slide below. As the fire becomes hotter it induces a greater 'pull' at the inlet slide, and this is the cause of the trouble. To overcome the difficulty I closed the air-slide, removed the protruding handle of the shaking-grate, and closed the holes in the casing so that no air enters below the fire. The chimney-damper is 'closed,' but there is still a safety margin which ensures a 'pull' above the fire. There is a passage-way free from coke connecting the space above the fire with the space beneath the fire. It is formed by the front vertical bars which retain the fuel bed; and there is produced in effect a balanced-flue principle which ensures steady burning and avoids the extremes of incandescence.

At night the shaking-grate is operated and the fuel immediately above the grate is loosened with the poker, the ashes remaining in the ashpit. The fuel bed is then fully charged. In the morning the shaking-grate is again operated, the fire is poked, the ashes are removed, and the fuel bed is fully replenished.

My coke boiler, operated as outlined, runs regularly without relighting for from four to six weeks. It consumes only 12 lb. of coke in 24 hours and at present prices it costs only ¼d. an hour. For this sum I get all the hot water I need, a warm bathroom, and a house with a 'lived-in' atmosphere.

Yours faithfully,
H. J. TOOGOOD.

*Hampton-on-Thames.*
*November 10, 1953.*

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The Institute of Municipal Treasurers and Accountants has issued, in conjunction with the Society of County Treasurers, a new *Analysis of Rateable Value of England and Wales.* This is the first comprehensive analysis of its kind to be made, and the figures will provide a useful basis for research into many aspects of local government finance. The tables will be useful in considering the possible effect of revaluation under the Local Government Act, 1948, when this comes into operation in 1956. Throughout the country (excluding Hampshire) there are 4.3 mill. hereditaments whose rateable value does not exceed £10, and a further 4.6 mill. whose rateable value lies between £11 and £20.

# Diary

**Nov. 18-Dec. 2.**—BUILDING EXHIBITION, Olympia. Gas Council exhibit.

**Nov. 18.**—WESTERN JUNIORS: Visit to E. Cockey & Sons, Ltd., Garston Works, Frome, followed by film and paper on the erection of a 300,000 cu.ft. holder at Tavistock.

**Nov. 19.**—EASTERN JUNIORS: 'Measuring Instruments,' C. E. Hammond, Technical Adviser, Walker, Crosweller & Co., Ltd., March, Cambs.

**Nov. 19.**—WALES JUNIORS (NORTH): 'Resuscitation and First Aid in the Gas Industry,' R. H. Hanford, at Penmaenmawr.

**Nov. 20.**—NORTH OF ENGLAND SECTION, I.G.E.: Visit to Parkfield Works (new site) of Ashmore, Benson, Pease & Co., Ltd., 11 a.m.; luncheon; afternoon session, 'Some Aspects of Gasholder Construction and Operation,' N. Broadbent and J. A. Walton.

**Nov. 24-25.**—INSTITUTION OF GAS ENGINEERS: Autumn Research Meeting, Church House, Westminster. (For full programme see 'Gas Journal' of Nov. 11, p. 403.)

**Nov. 26.**—NORTH THAMES G.C.C.: Westminster City Hall, Charing Cross Road, 2.30 p.m.

**Nov. 26.**—BRITISH GAS STAFF ASSOCIATION: 'Unity for Gas Staffs' meeting, Onward Hall, Deansgate, Manchester.

**Dec. 3.**—BRITISH GAS STAFF ASSOCIATION: 'Unity for Gas Staffs' meeting, Crown Hotel, Hill Street, Birmingham.

**Dec. 2.**—SOUTH WESTERN SECTION, I.G.E.: Joint meeting with South Western Section, Institution of Civil Engineers, Bristol, inspection of Stapleton Road works, 11 a.m.; meeting 2.30 p.m.; paper, 'Erection of Reinforced Concrete Tank for 6 mill. cu.ft. all-welded Gasholder,' Eales and Turner, of A. Monk & Co., Warrington.

**Dec. 2.**—SOUTH WESTERN G.C.C.: 34, Bridge Street, Taunton, 11 a.m.

**Dec. 4.**—LONDON JUNIORS: Annual Reception and Dance, Caxton Hall, St. James's Park.

**Dec. 5.**—SCOTTISH JUNIORS: Joint meeting of Eastern and Western Districts, 'Coke Preparation and the Gas Engineer,' H. S. Hughes, Scottish Gas Board, at Edinburgh.

**Dec. 7.**—WEST MIDLANDS G.C.C.: Dudley Room, Queen's Hotel, Birmingham, 2.15 p.m.

**Dec. 7-11.**—SMITHFIELD SHOW. Earls Court. Gas Council exhibit.

**Dec. 9.**—LONDON JUNIORS: Visit to Hackbridge & Hewittic Electric Co., Walton-on-Thames.

**Dec. 9.**—MANCHESTER JUNIORS: Visit to A. V. Roe & Co., Ltd., Aircraft Works; 'Industrial Gas,' J. Palmer (Liverpool).

**Dec. 11.**—BRITISH GAS STAFF ASSOCIATION: 'Unity for Gas Staffs' meeting, Kent Hall, St. Andrews Halls, Glasgow.

**Dec. 12.**—WALES AND MON. JUNIORS: 'The Mechanical Side of the Gas Industry,' L. Starr, Wales Gas Board Headquarters, Cardiff.

**Dec. 18.**—LONDON JUNIORS: 'Coke and the Future,' F. S. Evans, Coke Manager, South Eastern Gas Board; 178, Edgware Road, 6.30 p.m.

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## GAS ON TELEVISION

*Viewers of the 'About the Home' Television programme on October 29 saw a display of gas appliances illustrating new developments and the latest accessories. With Miss Joan Gilbert, who compered the programme, is Mrs. Eileen Murphy, Home Service Officer of the Gas Council, discussing the newest designs in gas fires, from the handsome semi-circular Port Royal, which gives radiant and convected heat, to the two latest portable fires, the Cannon K12 and the Paraglow. On the right can be seen the B.B.U. gas conversion unit, which is inserted in an open back boiler grate to give hot water during summer months.*

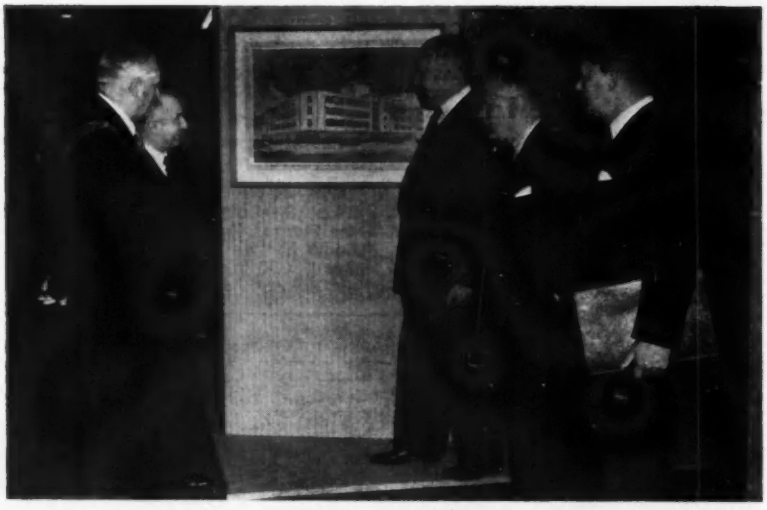
# Gas in the Design for Living

To radio listeners in the West of England 'Ma Luscombe' of 'The Luscombe Family,' a B.B.C. West of England serial feature, is a mythical figure, probably represented in the imagination as a somewhat buxom homely West Country housewife, whose daily affairs are the basis of the 'At the Luscombes.' To the crowded audience who attended the opening ceremony of 'Gas in the Design for Living' in the Abbey Hall, Plymouth, on October 21, Miss Phyllis Smale presented herself as an attractive, educated, and excellent speaker. In fact any association with 'Mrs. Luscombe' was difficult to appreciate.

During her address, following her introduction by the Lord Mayor of Plymouth (Alderman Sir Clifford Tozer, J.P.), in the presence of the Lady Mayoress of Plymouth (Lady Tozer), the Chairman of the South Western Gas Board, Mr. C. H. Chester, C.B.E., and Mrs. Chester, Miss Smale became 'Mrs. Luscombe,' and for some minutes the audience were privileged to hear, and enjoy, a short private session of the 'Luscombe Family.'

But what is more important, Miss Smale's comments, which came quite spontaneously, created the impression that 'Mrs. Luscombe' was a firm believer in, and user of, modern gas appliances, even if a lot of her remarks were put over in a humorous vein.

*General view of the exhibition hall.*



*The Lord Mayor of Plymouth (Alderman Sir Clifford Tozer, J.P.) with, from left to right, Alderman H. E. Wright, J.P. (Area Board Member), Mr. C. H. Chester, C.B.E. (Chairman, South Western Gas Board), Mr. J. Carr, O.B.E., M.C. (Area General Manager) and Mr. L. P. Ingram, M.B.E. (Southern Divisional Manager) examining the illustration of the new service centre for the City of Plymouth.*

Perhaps one of the most interesting items which required the least display at the exhibition, and which aroused the greatest interest, was the architectural painting of the new service centre, the erection of which it is hoped will commence during the coming year. The new service centre will replace the showrooms destroyed by enemy action, and will form part of the City of Plymouth re-building programme. This imposing building is to be erected in one of the most prominent positions selected on the Royal Parade, Plymouth.

The exhibition itself, although limited in size due to the lack of suitable halls in Plymouth, was of attractive design and decor. The exhibition layout was prepared and constructed by the Southern Divisional Publicity Department in full co-operation with the Plymouth and North Cornwall Sub-Division, under the overall supervision of the Sub-Divisional Manager, Mr. J. W. Dean.

To maintain a continuity of attractions, mannequin parades were staged twice a day through the co-operation of E. Dingle & Co., Ltd., Plymouth, and in addition the Plymouth home service department arranged short cookery demonstrations, which were given by Miss K. Jenkin and Miss M. Mill, home service advisers.

The exhibition remained open for 11 days, and attracted large attendances throughout, with consequent satisfactory sales results of 137 gas cookers, 57 water heaters, 10 gas fires, and 13 coke grates. In addition there were over 60 firm appliance enquiries.

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TRANSPORT COSTING is the first of a series of reports sponsored by a joint committee of the Institute of Municipal Treasurers and Accountants (Incorporated) and the Institute of Cost and Works Accountants. (Gee & Co. (Publishers), Ltd., 27, Basinghall Street, London, E.C.2, 2s. 6d. post free). This joint committee was established in 1951 to promote and encourage research into cost accountancy as effecting local and public authorities. Both Institutes have for some years past conducted research into subjects of special interest to their members and the profession, and have issued a number of publications giving the results of their investigations.

FROM the Structural Insulation Association we have received a copy of the new (seventh) edition of the Association's booklet entitled 'How to Insulate Buildings.' The booklet (which is available without charge to interested applicants) gives brief details of the types of insulating materials available and explains the ways in which these materials can be incorporated into buildings simply and cheaply, to ensure good thermal standards. The Association is confident that action by designers of buildings on the lines suggested in the booklet will be of great assistance in making our fuel supplies equal to our needs.

IN a preface to the latest dition of the *Year Book of the Heating and Ventilating Industry* (8s. 4d. post free, from Technitrade Journals, Ltd., 8, Southampton Row, London, W.C.1), the author, J. N. Saunders, asserts that the publication is now accepted as a standard book of reference, used by all who come in contact with th industry. Mr. Saunders, who is President of the Association of Heating, Ventilating and Domestic Engineering Employers, has succeeded in producing in one volume technical, contractual, and other trad information for the benefit of architects consulting engineers, and others in contac with heating contractors.

# Gas in FRANCE

## *abstracts from the French technical press by 'ASHTON'*

THE Editor of the *Journal des Usines à Gaz* comments in his September issue on the series of strikes which had affected, principally, the public utilities for several weeks. The gas industry had seen a reduction in output during most of the month of August. If supply had been maintained practically everywhere—sometimes under precarious conditions—it is to be feared there was some dissatisfaction on the part of industrial consumers who found some of their processes paralysed by disturbances in the supply of fuel. One must hope that these reactions will not have excessively severe consequences on the development of sales.

On this subject he cites a brochure recently published by the Commercial Department of Gaz de France which sums up results achieved in 1952. While the distillation of coal remains the principal method of gas production in France, the employment of petroleum products continues to increase with the development of new techniques. Coal carbonised has increased by 24% between 1947 and 1952, but the consumption of paraffin distillates, heavy oil, and propane, negligible in 1947, has grown respectively to 39,000, 6,000, and 5,600 tonnes. More refined fuels, gas oil and light oil, have, on the other hand, been more and more abandoned.

Concentration and inter-connection continues. There are now no more than 341 undertakings (against 430 in 1947) producing annually less than 10 mill. cu. m. (say 350 mill. cu.ft.), while three undertakings have been added to the 28 above this capacity existing in 1947. And the length of inter-connecting mains has more than doubled.

Sales of natural gas remain pretty constant at 52 mill. cu. m. at a high calorific value. On the other hand, Gaz de France is using 564.5 mill. cu. m. (19,792 mill. cu.ft.) of coke oven gas against 393 mill. cu. m. (13,878 mill. cu.ft.) in 1947, attaining very nearly one-fifth of the total send-out which itself reached 3,000 mill. cu. m. (105,940 mill. cu.ft.), an increase of 16% over 1947.

### Onia-Gegi

MM. Delsol, Billion, and Pilloy report briefly in the *Journal des Usines à Gaz*, September, recent tests on this plant (described by Messrs. Robertson and Harrison, of Dublin, *Gas Journal*, September 23, p. 770) with a view to the production of gas of a higher calorific value, 9,000 to 10,000 kcal. (940 to 1,050 B.Th.U.). The only modification was the replacement of some centimetres of the special shock catalyser placed in the upper layers of the catalytic bed by the same thickness of a less porous material, the rest of the bed remaining unchanged. In the apparatus only the conversion fuel oil pump was changed to one of greater capacity—and the orifice of the injector was modified correspondingly.

After a week of regulation and preliminary tests, the plant was maintained during 32 hours producing gas at 9,500 kcal. (994 B.Th.U. per cu.ft.) after condensation and detarring but with debenzolisation, with, however, a shorter cycle. Temperatures in the catalyser were 640°C. at the end of heating and 625°C. at the end of gas-making—and at the entrance of the cracking chamber during the heating period 580°C. Gas at 9,510 kcal. per cu. m. (1,005 B.Th.U. per cu.ft.) had a density of 0.72 with CnHm 29.1%, $H_2$ 24.4%, $CH_4$ 30.9%. Consumption of fuel oil per 100 cu. m. of gas dry at 15°C., 760 mm., was 149 kg. (136 kg. for cracking and 13 kg. for heating).

The tests show that the same plant with an almost identical catalyser bed can produce gas ranging from 4,000 to 10,000 kcal. (420 to 1,050 B.Th.U. per cu.ft.) with capacities only 8% to 10% less when making gas at the higher values.

The gas produced at the higher calorific value presents certain advantages over that produced in processes, such as that of Hall, of thermal cracking. Its hydrogen content is higher and its density appreciably lower, increasing its possibilities in admixture with water gas or producer gas for the production of peak load gas. Thermal efficiency is of the same order as that of the Hall process; on the other hand, the tars produced seem to possess a lower market value.

Although some points in the operation of the ONIA-GEGI plant remain to be cleared up in the course of a longer period of use, the results obtained in these first tests point to an enlargement of the field of application of this technique in the gas industry.

### Water Pollution

The August and September issues of the *Journal des Usines à Gaz* carry in two parts a complete study of the legal position in France of gas and other works in regard to the pollution of running waterways by industrial effluents.

### Aesthetics

Our colleagues in France are again applying themselves to the question of the aesthetical problems in gas, its utilisation and its manufacture. Readers will remember that the aesthetics of the gasworks has been treated at length by M. Combet and before him by M. Veillon, whose Notes d'Architecture Industrielle was so vivaciously written and admirably illustrated mostly by sketches from his own hand. MM. Kec and Verret presented a paper, under the title 'the gas industry and the aesthetical problems which it raises,' to the International Congress of Industrial Aesthetics held in September. They remark at the onset that in the last 20 years something new and 'young' has been made of one of the oldest industries of the present day, both in the means of production of gas and in the great variety of its utilisation, and that it is no longer possible to speak of a divorce between technique and aesthetics. 'By its intrinsic qualities of cleanliness, flexibility, "instantaneous-ness," gas, an element of modern comfort, has simplified the work of the housewife in the preparation of food, it has placed at her disposal a permanent and inexhaustible supply of hot water, a silent means of cold storage for the preservation of food, and it has taken all the hard work out of space-heating.' In new buildings the kitchen is clean, bright, and gay, instead of the dirty hole it used to be which everyone wished to avoid. And so on.

Of the aesthetics of the gasworks we have reported enough. But these writers again admit that the gasholder remains an intractable factor. The Editor of the *Journal des Usines à Gaz* claims indeed that something has been done by a study of painting to harmonise 'the geometric silhouettes of our reservoirs with the vegetation and roofs of its surroundings,' but our authors remark somewhat ruefully that the gasholder has unfortunately become the hall-mark of the gas industry. 'The universal voice proclaims its ugliness. It is true that, in spite of the relativity of taste, unanimity is readily attained against the ugly, but there is never agreement about the beautiful. It must be admitted that there is nothing aesthetic about the gasholder. Shall we blame its form? At a distance it has a contour of simple geometric lines which are not intrinsically ugly; is not the cylinder an architectural form much admired in the round tower of the ancient chateau

or in the lighthouse? Do we object to its varying height? It is a sort of immobile monster which one could forget in the evening when it is empty only to find it again with some irritation in the horizon of the morning. Even if a certain value of the height/diameter ratio would not be displeasing to the eye such a proportion could be kept for periods of short duration only since the demand for gas has no respect for this aesthetic proportion. The spiral holder may be taken as solving 50% of the problem. Painting in appropriate tints can go a long way.'

## Coke

The market for coke in France has been experiencing heavy weather. So much so that a vigorous selling campaign has been set on foot. The details of the means of propaganda employed, example of posters, etc., are given in an article in the October *Journal des Usines à Gaz* by M. R. Dury, Chief Engineer to the Commercial Department of Gaz de France, details which will not be without interest to our own salesmen.

In the same issue M. Ch. Tixier, formerly Joint Director of Equipment, Gaz de France, summarises recent British studies of oxide purification—covering the three main publications GRB43 (1948), GRB52 (1949) and GC7 (1952). No comment is made.

In a discussion before the Sté. des Ingénieurs Civils de France, M. R. Egalon, Head of the Laboratories at the Madeleine-lez-Lille of the Establissements Kuhlmann, discussed the reactivity of cokes in relation to results obtained in water gas generation. He made the point that one must strike a medium between operation at high temperatures giving the maximum $CO/CO_2$ ratio and at a lower temperature giving a minimum of coke consumption per unit of gas calories generated. Among other points he suggests that results can be improved by the addition to the coke of small proportions of iron oxide ($Fe_2O_3$) up to 1%; this may have a catalytic effect. M. Cassan raised the question of the catalytic effect of the ash already in the coke and observed that its effect undergoes an abrupt change when raised in temperature to near fusion point.

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# 'OPPORTUNITY'

THE following consists of extracts from the questions raised and the replies given during the discussion on the paper 'Opportunity' given by Mr. John Wilson to the Manchester and District Section of the Institution of Gas Engineers. An abstract of the paper was published in the 'GAS JOURNAL' of November 11, p. 390.

Mr. **J. G. Tilley** (Huddersfield-Halifax Group) asked for some indications as to the level in the organisation of the Transport Officer, and also an idea of the incentives given to operatives. He asked, too, whether the number of vehicles necessary was reduced by the type of organisation of coke delivery.

Mr. **Wilson** explained that the Transport Officer was responsible directly to the General Manager. As yet there was no incentive scheme, but no doubt there would have to be one as the domestic coke deliveries increased. In regard to deliveries, up to the present there had been a saving of approximately 6% on transport, but this was by no means a final figure and they were constantly investigating and making amendments to the present system. He believed that the saving would ultimately amount to something like 12½%.

Mr. **W. B. Harrison** (Bury-Rossendale Group) asked for further information about the training of technical students on the production side. Was training given in accountancy, administration, sales and services, etc.? Costing statistics should be appreciated by students. Did inter-change of students actually take place between the various departments, and had the author any difficulty in recruiting suitable students? Turning to the industrial load, was it that Manchester consumers were so pleased to get an adequate supply of gas that prices did not matter, or did the smokeless zone affect the industrial consumer? He wondered whether the order card scheme for coke was bringing in new business. He was interested in the scheme to deliver 1 cwt. bags of coke in railway wagons to merchants' depots. What was the delivery charge, and what responsibility was accepted for the 1 cwt. bags?

Mr. **Wilson,** in reply, said that the training of students had now been taken over by the Board, but in the past they divided them into two sections—(a) manufacture students, and (b) distribution students. The former were first put into the drawing office for 12 months, as they felt it was necessary that they should be able to read drawings and make presentable sketches. They were then sent to the Altrincham station—the smallest of their works—in order that they should get an overall aspect of the manufacture of gas rather than specialised experience on one of the larger works. They had found that during this training the student had shown a definite leaning to the pure chemistry side, the carbonising side, or the mechanical engineering side, and after discussion with the boy (and his parents) he had been drafted on to the side for which he had a natural tendency, and in the majority of cases had been transferred to one of the larger works where specialisation could be practised more effectively.

They had not given any training in accountancy, administration, or sales and service, but had afforded students opportunities of attending station engineers' meetings, in order to assess the value of costing statements. They had no problems at all in recruiting suitable students.

There is no doubt that the smokeless zones in Manchester, plus the potential smokeless zones, had helped considerably in increasing the industrial load, coupled with the fact that they had a good sales organisation who dealt direct with industrial consumers.

The order card scheme for coke was working satisfactorily; the difficulty was with the registration of consumers. It was significant, however, that since commencing this scheme their maximum weekly coke sales were six weeks in advance of 1952. In regard to the delivery of 1 cwt. bags of coke in railway wagons, they had a provisional charge of 7s. 6d. a ton, and an agreement with the merchants that this could be modified one way or the other at the end of the three months trial period. It was clearly understood that the merchants accepted the responsibility for seeing that there was 1 cwt. of coke in the bag.

Mr. **L. G. Townsend** (Liverpool Group) commented that the choice of horizontals for the new installation at Bradford Road was surprising. Recent opinion was that the horizontal retort had a very limited application in present-day circumstances. Was there any special reason for the installation of such a comparatively large unit of this type of carbonising plant in this instance? Turning to the carbonising results generally and the very effective control which had been established in the Manchester Group, it would be of interest to know whether some method of instituting target results had ever been given consideration.

Although in the past responsibility for the education and training of production personnel had fallen on the group chemist, it by no means followed that he was the best person for the job. Presumably with the recent changes such matters would in future be handled by the principal of the colleges recently appointed in the area.

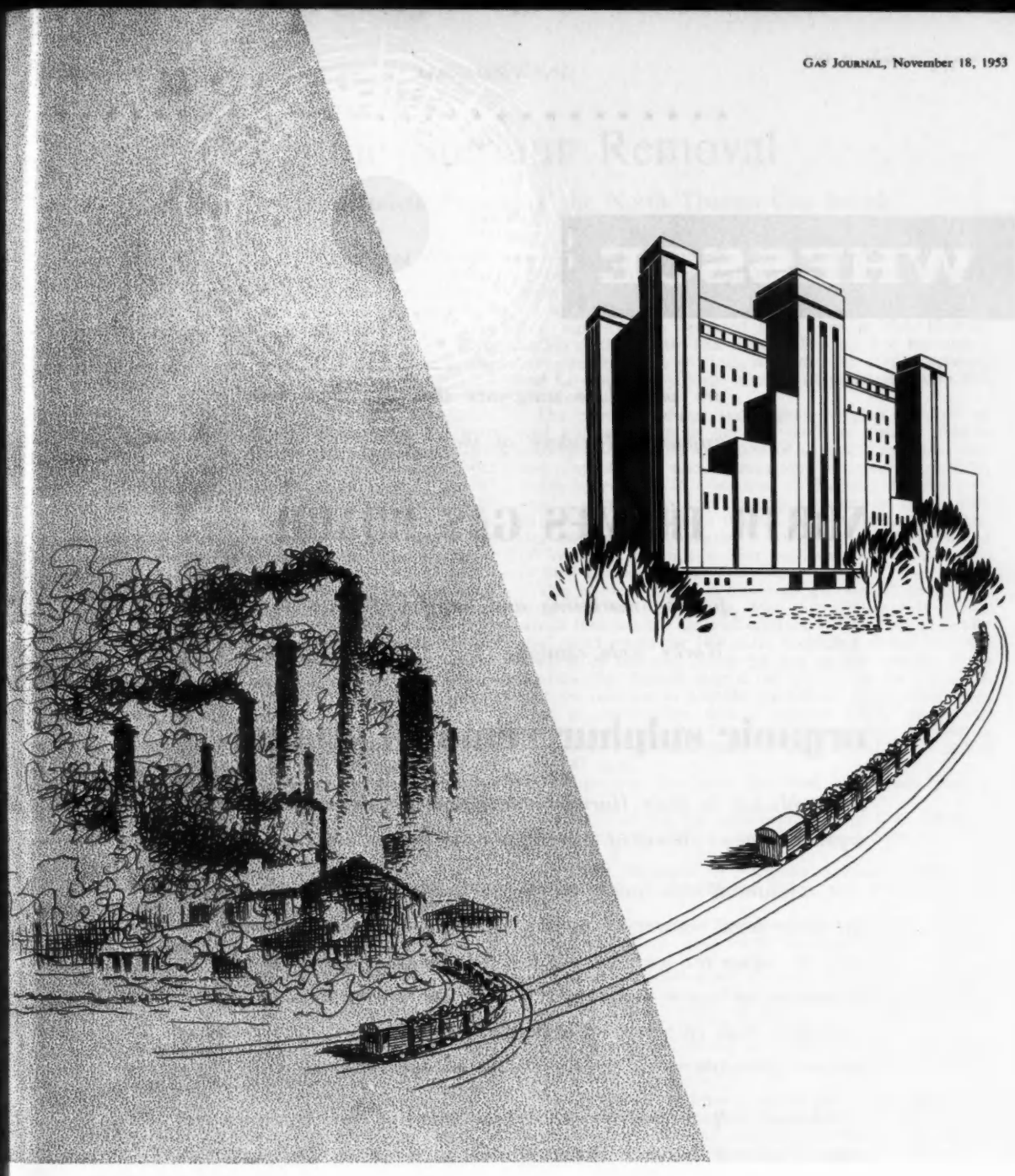
Mr. **Wilson** explained that the choice of horizontal retorts for Bradford Road was, in the main, due to the type of coal they were able to obtain. In the Manchester Group they had a preponderance of vertical retorts and it was felt that, in the long term, they would be compelled to carbonise a certain percentage of washed slacks.

They had never fixed a target for the stations; but the station engineers looked upon first-class results as a matter of professional pride.

Education of production personnel was now being handled by the Board and the group chief chemist had now almost handed over his responsibilities in this direction.

Mr. **G. W. Perks** (Chairman, Northern Section, I.G.E.) said that while one could not question the necessity for embarking on these schemes, the capital outlay involved must be enormous, consequently one could not help but contemplate whether the economies effected by the installation of more efficient plant were adequate to offset such charges. It might be that expanding demand had taken care of this aspect up to the present, but unfortunately there were signs that the levelling up process was upon them—indeed decreases were being recorded in some places. It was to be hoped that the intensive sales drives now being organised would have the desired effect.

Mr. **Wilson** replied that the capital outlay involved in the reorganisation of the Manchester Group was high, but, as the sales of gas showed, they had to decide whether to spend the capital or reconstruct their output within the capacity of their carbonising plant and distribution mains. There was no alternative. It was, therefore, decided that they should progress, and with the progress came the increased capital charges. He believed that the levelling up of gas sales at the present moment was only a hesitation in the extension. Even with their current prices of gas, they were now negotiating with one company for a load of 1,000 mill. cu.ft. a year, and another negotiation had just been completed for 500 mill.



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*as established in their Harrow installation, for the reduction of the organic sulphur content of Town Gas to 10 grains/100 cu. ft. or less.*

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# Organic Sulphur Removal

## Development of the Catalytic Process of the North Thames Gas Board

THE North Thames Gas Board has appointed Whessoe Ltd., of Darlington, a licensee of its process for the catalytic removal of organic sulphur compounds from town gas on the gasworks scale. It is therefore appropriate to review the history and objects of this system which was developed in the Fulham Research Laboratories, and to which references have, from time to time, appeared in the 'GAS JOURNAL.'

### Objective

To comply with statutory regulations, town gas may not be distributed with a hydrogen sulphide content exceeding 1.5 parts per mill. No limit is placed upon the organic sulphur content, which varies between 15 and 45 grains of sulphur per 100 cu.ft., according to the type of coal carbonised and the carbonising and purifying plant. The carbonisation of coals of high sulphur content in the post-war period has tended to increase the organic sulphur concentration.

The combustion of gas containing organic sulphur compounds gives rise to sulphur dioxide and trioxide, which cause corrosion in domestic appliances (particularly water heaters), pollution of domestic atmospheres when using flueless heaters (thereby limiting their application), and undesirable effects in industrial furnace atmospheres (*e.g.*, scale and corrosion in the heat treatment of special steels, and bloom on fine glassware).

It has long been recognised that it is anomalous to reduce the hydrogen-sulphide content of gas to 1.5 parts per mill. yet to leave up to 600 parts per mill. of organic sulphur therein. Frequent reference has been made to the desirability of reducing the organic sulphur content to below 10 grains per 100 cu.ft.—*e.g.*,

Report on the Removal of Sulphur Compounds from Town Gas. Inst.Gas Eng. Comm. No. 146, 1936.

Report of the Committee of Enquiry on Sulphur Removal. Inst.Gas Eng., Comm. No. 250, 1942.

A Survey of the Distribution of Organic Sulphur Compounds in Town Gas. Gas Research Board, G.R.B. 17, 1945.

'The Gas Industry' (The Heyworth Report). Ministry of Fuel and Power. Cmd. 6699, 1945.

Discussion at Institution of Gas Engineers May, 1953, meeting, on Anglo American Productivity Report. 'GAS JOURNAL,' 1953, **274**, 690.

These recommendations would unquestionably have long since been widely implemented but for the post-war shortage of steel, which has restricted its usage to applications of highest priority. With the prospect of some easement in the position, the provision of plant for removal of organic sulphur compounds again comes to the fore.

### Effect of Benzole Extraction

A normal benzole washing plant, using 8 to 12 gal. of oil per 1,000 cu.ft., will reduce the organic sulphur content by about one-third, by absorption of most of the thiophen and a part of the carbon disulphide, while a plant of the high oil circulation type, or an active carbon absorption plant, will further reduce it by absorbing more of the carbon disulphide. In favourable circumstances either of the last two processes will provide a satisfactory reduction, but the application of these processes is controlled by the economics of benzole extraction.

### North Thames Catalytic Process

This process may be regarded as a successor to the original catalytic process pioneered by Carpenter in 1913. It uses a catalyst of similar chemical composition (nickel sub-sulphide), but there the similarity ends, as the physical form of the catalyst and its support are entirely different, the operating temperature is lower, and the process is one of oxidation, and not reduction. Moreover full advantage has now been taken of modern methods of heat exchange to increase the thermal efficiency of the process, which is now available in fully developed commercial form.

On the works scale a first plant of 1.5 mill. cu.ft. per day capacity has operated since 1938 at the Harrow station of the North Thames Gas Board. For the industrial consumer, Birlec, Ltd., are licensees of the process, and have supplied a large number of packaged plants for gas-fired furnaces.

The process reduces the organic sulphur content of coal gas to 10 grains per 100 cu.ft. or less. This is accomplished by the oxidation of carbon disulphide, carbon oxysulphide, and mercaptans, to sulphur dioxide, which is removed in a scrubber. The heat for the process is supplied by the catalytic combustion of a small part of the hydrogen in the gas, with oxygen, the admission of which is automatically controlled. A small amount of hydrogen sulphide is also produced, and is absorbed in final purifier boxes.

The above sulphur compounds are almost completely removed, but the process does not eliminate thiophen, which thus sets the limit of catalytic purification, generally to 6 to 10 grains per 100 cu.ft., according to the thiophen content of the gas. Thus the use of this process alone enables the desired degree of purity to be obtained, without recourse to benzole extraction. If, however, it is used in conjunction with a benzole plant, which will remove most of the thiophen, the sulphur content is reduced to a very low figure, of the order of 2 to 5 grains per 100 cu.ft.

The process has been described in various papers, notably:—

Removal of Sulphur Compounds from Gas, Hollings, Hutchison, and Griffith. Inst.Gas Eng. Comm. No. 175, 1937.

Catalytic Removal of Organic Sulphur Compounds from Coal Gas. Griffith and Plant 'GAS JOURNAL,' 1944, **244**, 48.

Catalytic Removal of Organic Sulphur Compounds from Coal Gas. Plant and Newling. Inst.Gas Eng. Comm. No. 344, 1948.

Catalytic Oxidation of Organic Sulphur Compounds in Coal Gas, Griffith. American Chemical Society, 1952. *Ind. Eng. Chem.*, 1952, **44**, 1011; 'GAS JOURNAL,' 1952, **271**, 475.

The process is covered by North Thames Gas Board B.P. Nos. 489398, 528848, 529711, 535482, 554691, 556169, 597501, 601320, 619585.

An important additional advantage of the process is that it destroys nitric oxide catalytically (by conversion to ammonia and nitrogen) and thereby prevents the formation of nitrogenous gum.

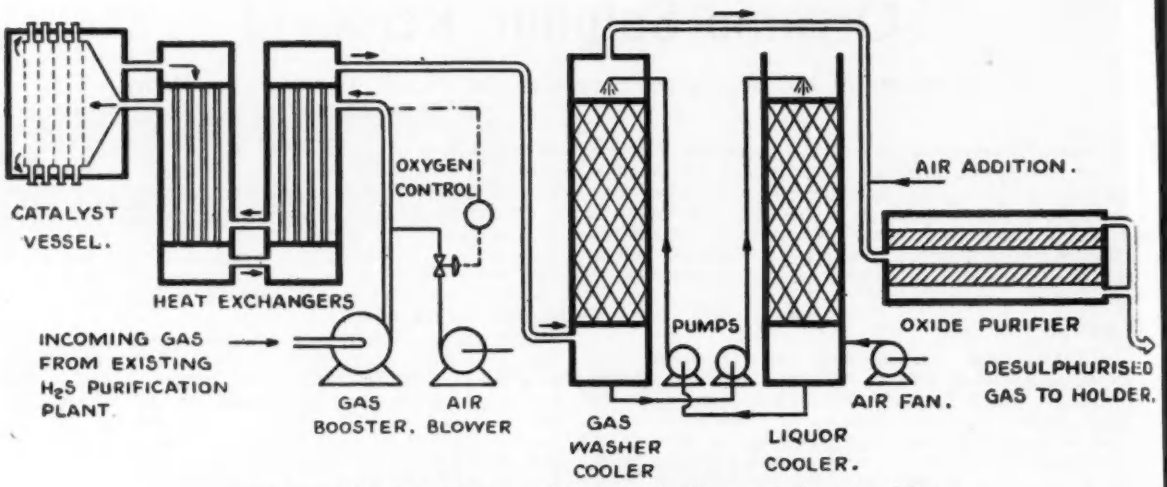
### DESCRIPTION OF THE PLANT

The gas, after leaving the normal oxide purification plant, passes through heat exchangers to the catalyst vessel, the hot outlet gas leaving via the heat exchangers where most of its heat is imparted to the inlet gas. The catalyst is maintained at a temperature of 350°-380°C. The treated gas is scrubbed and cooled in a washer-cooler and subsequently passed through final oxide purifiers before going to the gasholder. The flow diagram (overleaf) illustrates the process, which employs the following units:

(a) *Gas Booster.*—This is of the simple turbo-type and increases the gas pressure by about 12 in. W.G. to overcome the pressure losses of the plant.

(b) *Heat Exchangers.*—A large proportion of the heat required for the reaction is provided by heat exchange, the outgoing hot gas passing countercurrent to the incoming gas through two tubular heat exchangers of normal floating head design, operating in series.

(c) *Catalyst Vessel.*—The gas, which need not be completely purified from hydrogen sulphide, is passed into




*Flow diagram of the North Thames catalytic process for the removal of organic sulphur.*

the catalyst vessel, operating at 350° to 380°C. The organic sulphur compounds are oxidised to sulphur dioxide, as exemplified by the removal figures given in the following table:

| | S. Grains per 100 cu. ft. | | |
|---|---|---|---|
| | Inlet | Outlet | % Removal |
| Carbon disulphide | 17 | 1 | 94 |
| Carbon oxysulphide | 6 | 2.5 | 58 |
| Mercaptan | 1 | 0 | 100 |
| Thiophen | 6 | 6 | *nil* |
| Total | 30 | 9.5 | 68 |

The catalyst vessel and heat exchangers are lagged to conserve heat.

(d) *Oxygen Controller.*—The heat losses of the system are made good by the catalytic combustion of hydrogen. The requisite amount of air to bring up the oxygen content of the gas to 0.8-1.0%, is added at the inlet to heat exchangers, and is controlled by a Kent magnetic oxygen recorder, described by Griffith (Inst.Gas Eng. Comm. No. 395, 1951). This air is provided by a blower, which also supplies air for the burner for starting the process and for purifier revivification.

(e) *Gas Cooling and Scrubbing.*—The partially cooled gas from the heat exchangers is finally cooled and scrubbed free of sulphur dioxide using a weak solution of sodium carbonate in a packed washer-cooler, fitted with a Silver type distributor (North Thames Gas Board B.P. No. 487946). The scrubbing solution is cooled over a small forced draught cooling tower and is recirculated.

The scrubbing solution is kept alkaline by the addition of soda ash and bleed-off of effluent, preferably under automatic control. The volume of effluent liquor, which would not generally be regarded as noxious, is of the order of 300 gal. per mill. cu.ft.

(f) *Purifiers.*—Hydrogen sulphide to the extent of about 10 grains per 100 cu.ft. is produced by a side reaction, and final purification is necessary. By use of suitable operating methods such purifiers will only require changing annually. As the process will operate with a small hydrogen sulphide content in the inlet gas it may often be possible to install the plant in existing gas streams before the final or catch-boxes, thus reducing the capital charges.

(g) *Air Burner.*—A burner in which an air-gas mixture is burnt within the gas main (North Thames Gas Board B.P. Nos. 535482 and 556169) is used to bring the plant up to temperature when starting from cold.

(h) *Catalyst Production and Regeneration.*—The catalyst is produced by soaking china-clay pellets in a solution of nickel sulphate, drying, and reducing to the active sulphide in a stream of coal gas containing hydrogen sulphide. The catalyst eventually becomes fouled and is regenerated by oxidation of the carbonaceous fouling matter in a stream of hot inert gas to which is added a small amount of air to allow controlled combustion to take place. The catalyst is notable for the mechanical robustness of the pellets, which enables it to be regenerated many times without physical degradation.

Larger plants will have their own catalyst regeneration units, but regeneration may be centralised for the smaller plants. Catalyst manufacture will always be centralised.

(j) *Ancillaries.*—The plant will also require catalyst bins and hoppers, lifting tackle, platforms, and instrumentation.

## Cost Per Therm

The total cost, including capital and running costs, was given as 0.189d. per therm by Plant and Newling in 1948, and as less than 2% of the cost of distributed gas, by Griffith in 1952. Based on present-day costs of plant and services, and depending on the capacity of the plant and the organic sulphur content of the gas, the cost is expected to be of the order of 0.3d. per therm.

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## CHRISTMAS LECTURES FOR JUVENILES

THE third lecture for juveniles to be held under the ægis of the Institution of Gas Engineers will be given, by permission of the Governors and Principal of the Sir John Cass College, Jewry Street, Aldgate, E.C.3, in the College on January 1, at 2.30 p.m. The lecturer will be Mr. J. E. Davis, O.B.E., F.R.I.C., M.INST.GAS E., who has chosen as his subject 'The Movement of Gases.'

Following is a synopsis of the lecture: *Part I.*—The way they move: (a) how; (b) why. *Part II.*—Movement of gases in nature: (a) movements in the ocean of air; (b) weather and cloud formation; (c) sand and snow storms; (d) underground gases. *Part III.*—Movement of industrial gases: (a) gases used in industry—steam, air, fuel gases; (b) flow in pipes; (c) flow in engines, compressors and turbines; (d) flow in furnaces (e) ventilation.

Mr. Davis is the Chief Technical Officer of the South Eastern Gas Board. He is also a member and former Chairman of the Joint Research Committee of the Gas Council and the University of Leeds; a member of the Council of the Institute of Fuel and a member of the Council of the British Coal Utilisation Research Association. The lecture will be supported with practical demonstrations and experiments.

Admission will be free and tickets may be obtained from the Secretary, Institution of Gas Engineers, 17, Grosvenor Crescent, S.W.1, after December 1. The accommodation is limited to approximately 300.

# ELECTRONICS IN THE INDUSTRY

FROM A PAPER TO THE MIDLAND SECTION OF THE INSTITUTION OF GAS ENGINEERS ON OCTOBER 30, 1953, BY

*G. M. RIMMER,*

*M.I.E.E., M.Am.I.E.E., Electrical Engineer, West Midlands Gas Board.*

SOME little time ago, the Chairman of the West Midlands Gas Board, Mr. G. le B. Diamond, C.B.E., requested that a thorough investigation of electronic engineering be undertaken with a view to its application within the gas industry. This investigation is far from complete but sufficient has been learned to realise that the gas industry can benefit in many ways through electronic techniques.

The investigation into electronic applications has been proceeding for about 18 months and has included the inspection of numerous industrial applications in many industries, discussions with various manufacturers, and a general study of the various techniques and branches of the subject. The results have shown that what was once a much maligned subject has, within a decade, risen to the status of a basic industry.

Industrial control has by far claimed the greatest share of development and has been responsible for considerable savings in manpower, improvements in manufacturing methods, and a general increase in productivity. In addition, electronic technique has opened up new processes and provided the basis of entirely new products. The introduction of such methods into the gas industry will, no doubt, be fraught with difficulties, but providing manufacturers pay due regard to reliability and suitability of application there is no reason why such an introduction should not contribute materially to the progress of the industry.

The aim of this paper is to present a general statement of the progress to date and to offer some basic information on the subject to gas engineers in order that they may be in a better position to make their own appraisal of such items of equipment as may be made available. The language of electronic engineers is typical of their 'art.' No attempt has been made to provide a text on electronics, the sole aim is to stimulate interest in this science within the gas industry.

Briefly it may be said that an electronic valve possesses infinitesimal inertia and consequently provides instantaneous response. When used in conjunction with its associated circuitry of resistances, condensers, inductors, etc., it can be used to measure and control almost every physical quantity providing such quantity can be interpreted—no matter how indirectly—in terms of an electric current or voltage. With the same proviso it is also capable of solving the most complex mathematical formulæ with extreme rapidity.

Recent developments of the photo-cell have been directed towards increased sensitivity. The photo-multiplier is an example, consisting of a multi-stage amplifier using the phenomenon known as secondary emission. It is particularly responsive to the blue spectrum and its total amplification can be of the order of 250,000.

Electronic valves are tailor-made pieces of apparatus for individual jobs and the requirements are very varied. There are thousands of different types. The characteristics of a valve are liable to vary during its life so that some latitude has to be allowed when designing electronic apparatus. However, after the initial period of ageing it is found that the operating characteristics are relatively stable and that their useful life is considerably greater than the maker's guarantee.

## Application of Electronic Technique

If electronic apparatus is to be applied with success to industrial processes the basis of application must be physically sound. By this is meant that there must be some underlying basic theory between the connected quantities involved. Electronics can only perform on electrical quantities so that if this science is to be applied to industry such quantities as temperature, pressure, position, velocity, acceleration, light, fluid flow, proximity of bodies, etc., must be capable of conversion to basic electrical quantities. The equipment which is used for sensing these so-called prime functions is termed a 'pick-off device' or, more technically, a 'sensing element.' Considerable ingenuity has gone to the design of these sensing elements.

Having sensed and converted the prime functions into electrical quantities it is then necessary to amplify or treat this signal in some form or another in order to operate a controller which will ultimately react on the prime function.

Many process applications call for simple equipment which operates an on/off device. Timers, interlocks, thermostats, are typical cases. Electronics provides many examples of this nature. The equipment is relatively simple and available from almost any manufacturer of electronic equipment.

Electrical servo systems are not common in the gas industry except in instrument practice; indeed, they are extremely rare in comparison with hydraulic systems, although electrical power is very often used as the prime mover. Complete electrical systems, employing electronics, offer great scope to the industry.

## 'Servo' Mechanism

A servo mechanism is basically a proportional controller, in other words the correction is proportional to the error. There are, of course, limits over which this proportionality holds and in very accurate instruments it does in fact control only over a fraction of the possible error. In general, in order to obtain a quick response and high accuracy first derivative and integral control are built into the equipment, either singly or in combination, and in the theory of servo mechanism differential equations are used to obtain the transient terms from which the application of these various controls can be judged. For our purpose, however, it is sufficient to state that derivative control operates on the rate of control of the error—that is, the velocity with which the error is increasing or decreasing—also that integral control operates on the actual displacement from zero error position. The term integral should be interpreted as the integral of the displacement.

These three control actions are very readily provided by electronics. Proportional control is usually centred around the pick-off device while differential and integral controls are usually applied between the pick-off device and the amplifier.

Static communications in the gas industry are widely employed. Gaps do exist in the industry's communications service particularly in regard to mobile services. Electronics has now filled this gap completely, by means of short-wave radio communication. A number of systems are already in use mainly in connection with consumer services; the principles are well established within the industry and many companies are marketing standard equipment.

Electronic instruments can be conveniently divided into two categories:—

(i) Those using electronics for prime measurement.
(ii) Those using electronics purely as amplifiers, servos, or carriers for others forms of physical measurement.

The dividing line is very broad and, generally speaking, apart from research work, the gas industry is particularly interested in the second category. Electronic instrumentation excels in the handling of minute quantities at high

speeds. They are usually associated with low power drainage from the input device and provide easy methods of handling complex controls. Electronics has revolutionised instrument technique within a decade.

### Remote Control

Remote control is perhaps the most fascinating and most promising development of light electrical engineering. The advent of electronics into this field has been responsible for major developments; this in turn has stimulated the growth of automatic industrial control. This process has now become known as telemetering and supervisory control. They are quite distinct sections of electronics, but have much in common.

Telemetering has been defined as the instrumentation of a quantity at a remote point, while supervisory control has been stated as the system for the selective control and automatic indication of remotely located units, both by electrical means. It is usually inferred that supervisory control employs a single or small number of translating channels for a whole series of operations.

Supervisory controls in the gas industry have their greatest use in the operation of booster and compressor stations and for the control of levels, pressures, and so on. Frequently they are linked with a form of telemetering for indicating the various controlled quantities. Supervisory control generally requires a much higher degree of reliability than telemetering and speeds of operation are usually more important. The duty may also involve some form of monitoring process together with continuous visual indication. It may also be required that false operation of the supervisory gear itself is to be catered for and in some cases automatic monitoring of a healthy supervisory system is essential. The requirements of a satisfactory supervisory control system are certainly exacting, but there are numerous systems operating satisfactorily throughout the country.

Remote control by radio is, of course, still very much a new subject although it has been in operation for several years. It has always been felt that radio transmissions in this country were basically unreliable because of varying 'skip' distances. With developments in the high frequency field we have seen how reliable short-wave communication systems can be, and it is felt that in the future this is the direction in which remote control will develop. The technique is very similar to telemetering or supervisory control, and electronic pulse technique appears to be the most promising form of carrying out the coding.

## Applications in the Gas Industry

The gas industry has not yet applied electronics to any marked degree; experience is, therefore, meagre. However, as a direct result of the interest shown by the Chairman of the West Midlands Gas Board experience is being gained in the West Midlands area, and the following is a brief summary of a number of applications.

Standard methods of interlocking the sequence of conveyors and elevators present a number of undesirable features, particularly when applied to existing equipment. Invariably they are non-positive when connected to the electrical side and mechanically present drive difficulties especially when applied to slow moving shafts such as are experienced on gravity bucket conveyors. Moreover, all schemes are non-automatic—except at considerable expense—in the selection of a particular sequence, and phasing of a number of shafts cannot be carried out. A magnetically operated sequence and slip switch has therefore been developed for this purpose utilising pulse technique; it has no direct connection with any shaft and can be utilised on the slowest speeds. An electronic relay is actuated by these pulses giving the action of a centrifugal switch. The equipment is ideal for fluid-drives; and when utilised in association with electronic switching circuits, sequence selection can be made fully automatic with very small additional cost. It is also useful for phasing of any number of rotating shafts on gravity bucket plants in order to prevent serious damage in case of chain failure.

A sensitive pressure measuring device has been developed utilising a capacity sensing element to control an oscillator, the output of which is subsequently amplified and applied to a cathode ray tube; this enables all traces of instrument inertia to be eliminated and allows the actual pressure variations to be followed with the eye. Subsequently an electronic servo-mechanism was developed using this sensing element as a basic pick-off device for a governor.

An indicating meter has been built for measuring the concentration of dust emitted from the stacks of coke-dust burning boilers. This consists of a photo-electric multiplier operating at about 1,500 volts, and picks up light reflected from dust particles. A suitable electronic time delay circuit is provided for averaging the result.

When two gas streams are being mixed, calorific value control appears to be rendered more difficult due to variation of pressure of the diluent gas. A servo-system has been developed for controlling this pressure which takes its impulse from the speed of the station meter. A high frequency tachometer monitors the meter speed and feeds a signal to an electronic controller when it increases or decreases beyond a predetermined value. This controller operates an electric motor powered butterfly valve in the diluent stream.

The principle of the Fielden servo-graph is well known and operates from a simple U-tube gauge. This instrument is useful for coding pressures prior to their transmission on supervisory control or for telemetering.

Servicing of high voltage equipment is a difficult problem particularly when faults have to be traced. An electronic test set operating at 12,000 volts has solved this problem and eliminated the hazard of lethal high voltage shock. The speed with which testing can be carried out is phenomenal compared with normal methods.

Soil corrosion testing presents difficulties due to 'current drain' when utilising orthodox instruments. An electronic test set is now used for this purpose, and it completely eliminates this trouble.

An electronic metal locator is now used for cable fault location which has depth calibration and beat frequency modulation. The depth calibration assists considerably where cables and pipes cross one another while the beat frequency modulation eliminates spurious signals which may arise from electric cables, etc.

A tape recorder is being utilised by the sales and service department in connection with demonstrations and training of personnel.

Mobile radio communications are used extensively in the Board's area for mobile repair services.

Electrically driven compressors are usually governed by an on/off type of controller in conjunction with a time delay. A proportional controller has been developed for this purpose which will eliminate 'hunting' and time lag.

Inspection of running machinery presents difficulties, particularly with respect to couplings, which are a frequent source of trouble. A stroboscope has assisted very greatly in this matter. Couplings, pins and bushes can now be examined while in motion and under stress.

A fairly wide variety of speed control drives is in operation on positive and semi-positive compressors. Both anode and grid controls are freely used, the latter being favoured for small units while the anode or induction regulator control is preferred for large compressors or difficult conditions.

It will be seen from the foregoing examples that considerable emphasis has been placed on the development of pressure controls. While it is felt that this will prove a most profitable field of operation, the results have been somewhat easier to obtain. Hence their prominence. Calorific value control, together with the monitoring of district pressures, also appears attractive, but, in the end, there is no doubt that the maximum financial gains will be found in the automatic control field of production.

A number of other projects are in course of development involving servo-control of calorific value, radio telemetering of district pressures, instrumentation of detarrers, and automatic monitoring of quality and size of coke.

# COAL TAR AND ITS PRODUCTS

FROM A PAPER TO THE LONDON AND SOUTHERN JUNIOR GAS ASSOCIATION BY

*DR. J. R. DEWHURST,*

*B.Sc., A.R.I.C., M.Inst.Gas E., South Eastern Gas Board.*

EVER SINCE the end of the last century, and more than twenty years after Sir William Perkin synthesised the first aniline dyestuff, coal tar has been considered by the laymen to be the source of rather crude colours and dyestuffs and since 1910 of pharmaceuticals, notably aspirin, saccharin, etc. Most recently, he has heard that it supplies nylon and other plastics. In a way, all this is true, but pure chemicals and their intermediates represent only a very small proportion of the black bituminous liquid produced at the gasworks. In this connection the description given in one of the standard text-books of organic chemistry has much to commend it. 'It is an extremely complex mixture of substances, which may be roughly divided into those of acidic, basic, and neutral character.' That is, of course, the chemist's approach, but further on one finds 'Coal tar is probably put to a greater variety of uses than any other substance.' It is not so much the number of these uses as their apparent diversity which is so surprising; fuels and paints, roads and sheep dips, electric conductors and electric insulators, explosives and adhesives, moth balls, and armour plating. The contrasts are astonishing.

The physical structure of tar has long been the subject of investigation. Until recently, coal tar was generally held to be colloidal despite the absence of non-Newtonian flow properties and the failure to isolate compounds of really high molecular weight. More recently, it has been suggested by S. Pickles, of the Coal Tar Research Association, that it is a highly associated cybotactic liquid with few compounds of molecular weight above 1,000, the average being about 400. Whatever its fundamental structure, the important physical characteristics are immiscibility with water, Newtonian flow properties and rapid change of viscosity with temperature (high temperature susceptibility), good wetting power to almost all solids, and fairly high electrical resistance. It is these characteristics which have led to most of the uses of tar and pitch. The uses of the other products of coal tar, the naphthas, creosotes, pure chemicals, and coke are clearly dependent on special characteristics—their solvent power, disinfectant or fungicidal properties, reactivity, etc.

Some 50% of the crude tar is recovered as pitch and some 35% as creosote oils, so that 86% of the tar is used as creosote or as pitch or as a mixture of them—*i.e.*, refined tar. Of the remainder, about 1% is benzole for motor fuel or as a chemical, 1% is naphtha for use as solvent, 2% may be phenol and cresol for disinfectants, raw materials for nylon, etc., 2% may be bases for use in pharmaceuticals, while 8% is naphthalene used as a raw material for plastics.

## Tar Products as Chemicals

Only a small proportion of coal tar is used as a raw material for the chemical industry. It is significant, however, that the simple compounds, benzene, toluene, phenol, cresol, naphthalene, and pyridine are those most wanted as starting points in syntheses because it is then easier to insert the required radicals in the required positions. Two products are perhaps worthy of special mention because of their unexpectedness. Benzoic acid is produced in some tar works by hydrolysis of benzonitrile which is present as a very small proportion of the tar, but becomes an appreciable quantity when thousands of tons of tar are being processed. The other is probably better known. Mercury present in the coal in very small amounts distils off and condenses with the tar. It collects in the naphtha fraction of continuous stills and supplies the needs of at least the tar works laboratory.

Heavy fuel oils based on tar range from light creosote (CTF. 50) which is atomised in the burners at atmospheric temperature to medium soft pitch (CTF. 400), which must be heated to 400°F. before being fed to the burners. The most popular is CTF. 200, sometimes known as pitch/creosote mixture. These home-produced fuels contain less sulphur and give hotter, shorter flames than petroleum fuel oil.

A difficulty which it is hoped has now been largely overcome is the attack of the burner jets. With certain types of burner, the mild steel walls of the atomising jets may be attacked so that in a relatively short time the jet becomes enlarged, atomisation becomes less effective, and smoke and soot are produced. This trouble was not confined to those fuels which contain pitch, CTF. 50 and CTF. 100 were also sometimes troublesome. In general, the attack was limited to the 'pressure-jet' installations, where the high-speed passage of the fluid through the jet causes atomisation. The alternative systems in which air or steam is used to cause atomisation were less given to this trouble. It was first thought that the attack must be entirely due to erosion by the so-called 'free carbon' of the pitch or by suspended solid particles, but investigations have shown that corrosion by ammonium salts plays a significant part and that the attack is much reduced by so modifying the preparation that these corrosive substances are eliminated.

Coal tar pitch is virtually ashless and to that extent approaches the ideal fuel. Further, its sulphur content is very low and the hard grades are readily powdered. Hard pitch then forms an excellent pulverised fuel. Its use departs only slightly from normal pulverised fuel practice and that in the methods of preparation. Being a bituminous substance, coal tar pitch becomes soft when it is heated. This applies even with the hard grades used for pulverised pitch. It is necessary, therefore, that the grinding mills should be of the impact type since any rubbing of the pitch against a rough surface would tend to raise its temperature and might cause agglomeration and 'balling-up.' For the same reason, the pulverised pitch should not be stored in a warm place and the feed pipes to the burners should be carefully sited.

## Adhesives

It is perhaps as adhesives that coal tar products are most widely used. The rheological properties of tars and pitches make them very valuable for this purpose. Their Newtonian flow characteristics coupled with a fairly high surface tension (about 35 to 40 dynes per cm.) ensure good wetting of most solid surfaces and their high viscosity retards displacement either by mechanical means or by water to such a degree that for practical purposes it may be said to be prevented.

The most important use of tar as an adhesive is on the roads. During 1952, over 500,000 tons of road tar were produced in Great Britain. It may seem strange at first to classify road tar as an adhesive, but in practice it is used to stick stones to the road surface (surface dressing) or to stick them together (tarmacadam).

Pitch mastic is a mixture of fine mineral matter and coal tar pitch which, when hot, can be spread by hand floats. It has not been much used for road work. It gives a very smooth surface which is not affected by oil droppings and it can therefore be used for tank standing grounds since it is not torn up by the caterpillar tracks.

The building industry has only two adhesive uses for coal tar pitch, and in both cases the water-proofing effect is a secondary advantage. Pitch mastic is used, as indicated above, as a flooring and to a less extent as a roofing material, where perhaps its water-proofing properties are the more significant. It is made by mixing together finely ground limestone and a moderately soft pitch at a temperature of 140° to 150°C. The hot mixture, sometimes with the addition of small 'chippings' or grit, is laid and spread by hand, using wooden floats.

The high temperature coal tar pitches are practically opaque and very dark in colour, even vertical retort pitch

(*Continued on p. 468*)

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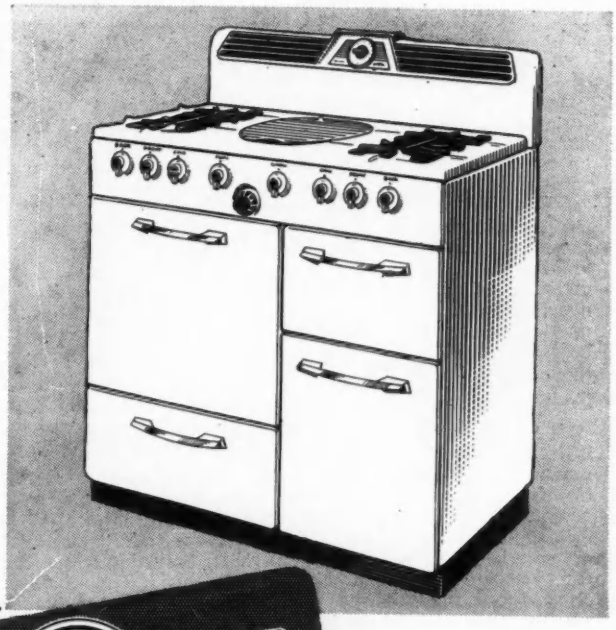

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(low aromatic pitch) appears to be black. It is not possible to make satisfactory coloured mastic floors with these pitches, but low temperature pitch is reddish brown in colour and almost transparent. In consequence, the addition of red or brown pigment colours the material and attractive red or brown mastic floors are produced.

Pitch mastic floorings have certain advantages over other forms of continuous floorings. They are cheap, easily laid, waterproof and, unlike mastic asphalt (the similar material made with bitumen), they are not damaged by fats or solvent-type polishes. This latter point is of importance for domestic floors, particularly in kitchens. Naturally, the housewife prefers a red or brown floor to a black one. In consequence, the demand has been for low temperature pitch and in fact has outstripped the supply.

As is to be expected, there are certain difficulties and drawbacks. Normal coal-tar pitch, even material as hard as that used in mastic, contains oils which have a fairly high vapour pressure at 150°C. and they give a certain amount of fuming during the mixing and laying. Loss of oil hardens the pitch, but this might not matter as allowance can be made by starting with a softer grade. What does matter is the obnoxious character of the fumes. The acridity of the fumes from mastic made with ordinary pitch makes the work of hand-spreading very objectionable, particularly in small under-ventilated rooms. This difficulty was overcome only after a very considerable amount of work. The solution, now incorporated in the relevant British Standards, was found by substituting for the tar oils a flux derived from petroleum, the aromatic extracts, by-products of the solvent treatment of lubricating oils.

A recent development in pitch mastic is the manufacture of flooring tiles. These are no more than a quarter of an inch thick and are laid cold on a screeded concrete base, thus saving material (mastic floors are ½ to ¾ in. thick) and enabling the work to be done without the use of cauldrons and boilers.

Pitch mastic for roofing would appear to be a relatively simple problem. It bears no static load and therefore the pitch can be softer and the spreading temperature lower. In practice, this is found to be so, provided the roof is flat and there is a retaining wall. Many roofs of 'British Asphalt,' as it was called, have given 40 or 50 years life. Modern practice in this country, however, calls for rather different treatment. The mastic is required to hang over the edge of the roof or where the roof abuts on a wall or chimney, the mastic must form a skirting some six inches high. These requirements have almost ruled out the use of pitch mastic. The trouble is that the vertical portions of the mastic flow and fall away unless the material is very hard, in which case cracks are liable to form in the winter. Laboratory experiments have indicated that a very promising method of overcoming these difficulties is the incorporation of fibrous matter; asbestos wool, slag wool, or even glass wool would be suitable. We are hoping to initiate experiments with these types of material.

## Coal Briquettes

The most important use of medium-soft coal-tar pitch is in the manufacture of coal briquettes. Many thousands of tons are produced in this country, and on the Continent, where the coal is of poor quality, enormous quantities are briquetted every year. The significance of briquetting is that for the expenditure of a small amount of material and some labour and heat, the inferior coal can be converted to a high quality fuel. The coal, crushed to less than ¼-in., is dried, mixed with the roughly crushed pitch, and heated in a mixer until the whole mix becomes 'mealy.' The mixture is then fed to the press. The briquettes may be large blocks weighing 25 lb. which are produced in a ram type of press, or the small egg-shaped type which are commonly used in domestic boilers and which are produced by passage of the mixture between indented rollers.

In this country the most important briquetting plants are in South Wales and treat anthracite fines. On the Continent, they are similarly situated at coalfields, but are operated on soft, brown coal as well as on hard-coal fines. On the Continent, the plants appear to work satisfactorily whatever type of pitch is used; low temperature, low aromatic, and high aromatic pitches are all accepted provided the softening point is correct. In this country the plant operators claim that only certain pitches are satisfactory, preferring those derived from horizontal retorts or coke ovens. Low aromatic pitches, from vertical retorts, are said to be inferior and low temperature pitch practically useless. The Coal Tar Research Association is at present investigating this problem.

The grinding of lenses is not the sort of operation which one would associate with coal tar; nevertheless, coal tar pitch is used to hold the glass blanks rigidly in position during the grinding process. The high temperature susceptibility and good adhesive properties of pitch make it suitable for this purpose, and having no chemical action on glass it is easily removed after the grinding operation is complete.

Another unexpected use of pitch is as armour plating. During the war mixtures of pitch, sand, and stone, similar in composition to ordinary pitch mastic, were poured while hot into a 3-in. space between metallic sheets so as to form a 'plastic armour' which was used for protecting ships' wheelhouses, gun sites, and other equipment where non-magnetic properties, light weight, or cheapness were essential characteristics. Bullets and small shells striking this material punctured the outside metal sheet and were then stopped by the viscous drag of the pitch mastic before reaching the plate on the other side.

## Coal Tar Paints

These are perhaps the most important water-proofing products of tar. These are usually prepared by mixing a soft pitch with a suitable, low boiling coal-tar naphtha or even benzole to give a consistency which is suitable for brushing. These simple coal tar paints, often known as 'black varnish' can give very good protection of steel if they are properly applied. The steel must be clean, free from grease, rust, and loose scale and the applied film must be continuous and of adequate thickness. If these requirements are fulfilled, good protection is achieved, and if after some 12 months a subsequent coat is applied, no further treatment will probably be needed for a period of years.

The simple solvent-type tar paints suffer from certain drawbacks. The high temperature susceptibility of the paint means that, if it is sufficiently viscous for good application during the heat of the day, it is much too viscous in the early morning when painting starts. Thus, it drags on the brush and the film is thick. On vertical surfaces this thick film sags when the temperature rises and forms 'runs.' The Newtonian flow properties of the dried paint film mean that similar 'runs' may develop where the correct thickness is exposed to direct sunlight on vertical surfaces.

Loss of oils, polymerisation of resinous matter, and oxidation by the atmosphere result in the formation of a surface skin on the dried paint. Continued action of light and air, coupled with temperature changes, causes shrinkage of the skin and cracks form to give a typical 'crocodile' pattern. These cracks rarely penetrate the whole film but clearly they weaken it and reduce the protection.

A number of methods have been employed for overcoming these faults. The addition of a suitable type of lamp-black imparts thixotropy to the paint. This means that the viscosity is reduced under stress and returns to the higher value when the stress is removed. After standing, the paint appears stiff (or even paste-like), but when stirred it 'breaks down' and becomes fluid. It is the 'broken-down' viscosity which matters when the paint is being brushed. This is low and therefore brushing is easy. When the brush has passed the paint 'sets' and the viscosity then being very high there is little or no tendency for the film to sag. Such paints are as easy to apply in the early morning as in the late afternoon.

Two warnings about tar paints should perhaps be included. They are not compatible with petroleum solvents so that in no circumstances should white spirit or paraffin be used as thinners and these solvents are not suitable for cleaning brushes. Tar paints contain certain

chemical compounds which prevent the drying of linseed oil. If then a tar paint is applied to a fresh linseed oil paint the film remains soft indefinitely. It is necessary to allow the linseed oil paint to become thoroughly hard, three to four weeks, before applying the tar paint.

### Research and Future Developments

Extensive work is being carried out by the Coal Tar Research Association, the Road Research Laboratory of the D.S.I.R. and by the tar industry itself in order to improve the properties of tar products. Considerable promise is shown by some of these investigations, but much yet remains to be done.

The flow properties of tars and pitches may be greatly improved for most purposes by the 'Metrofelt' process in which coal is heated with tar to give a colloidal dispersion. This exhibits elasticity and a 'yield value' (it will not flow until the stress exceeds a certain value), and its temperature susceptibility is low. 'Metrofelt' has been produced and used on a commercial scale, but certain difficulties in its manufacture and its relatively high volatility and the high proportion of oils which it contains have prevented development in this country. Its use in the U.S.A. is believed to be established, for built-up roofing and as 'hot enamel.'

More recently, work has been concentrated on the high temperature air-blowing of pitch. This gives a pitch of high softening point, which when fluxed with tar oil to the required soft pitch has properties similar to those of 'Metrofelt.' It has been produced in Germany as a commercial product but has not yet been established in this country.

The resistance of road tar to oxidation appears to be increased if the tar is blown with air at 70°C. in the presence of caustic soda. This process, developed by the Road Research Laboratory, is being tested on a commercial scale and a number of road tars which have been treated in this way are being examined by means of full-scale road experiments to see if they will give a longer life to tar carpets. At the same time, attempts have been made to remove all the phenolic matter from a road tar, since the tendency to oxidise appeared to be due to the presence of phenols. The improvement in a tar treated in a pilot plant has been found to be less than was expected and further investigation is necessary.

As a source of chemicals tar continues to receive attention. The Coal Tar Research Association is examining methods of extracting pure compounds and is also endeavouring to use the tar oils chemically without purification.

# DISTRIBUTION AND THE GOVERNOR

FROM A PAPER TO THE MIDLAND JUNIOR GAS ASSOCIATION BY

*F. J. HEALEY*

*Assoc.M.Inst.Gas E., Deputy Divisional Distributing Engineer, Birmingham, West Midlands Gas Board*

A GOVERNOR is fundamentally a valve, Its functions are fulfilled by variations in the arrangement of the control system, which uses the pressure of the gas stream—either above or below the valve—to achieve its purpose.

The equipment covered by the term 'governor' ranges from huge castings with outlets up to 48 in. down to tiny appliance governors which are extremely simple and which take their controlling pressure from their own outlet. Because of this wide range of use the governor is of prime importance in gas distribution. Broadly speaking, two purposes are served. First, to feed a low pressure network from a high or medium pressure source, and, second, to enable a supply of gas to be furnished to the consumer at a constant pressure. It remains true that the only variable which can be readily and economically controlled outside the works is pressure.

The original bell governor was soon joined by the simple diaphragm regulator in which the floating bell was replaced by a leather diaphragm attached to the valve spindle. This arrangement was more compact than its predecessor and had obvious advantages for use outside the works where the blowing of a wet governor constituted a hazard. It was still, however, a single valve governor with the disadvantage that variations of inlet pressure which played in one direction on the underside of the valve caused insensitivity and inaccuracy in governing. The outlet pressure played both on the underside of the actuating diaphragm and on the upper surface of the valve. Since the effective areas of these two surfaces were not equal, the governor was able to respond to outlet pressure changes, but the problem of inlet pressure variations led to the design of double or 'compensated' valves in which the inlet pressure played on opposite surfaces of two valves so that variations cancelled each other and were not transmitted to the outlet side. Later an alternative method of compensation on the same principle was evolved by the use of an auxiliary diaphragm in conjunction with a single valve. This overcame the difficulty of accurate adjustment to permit perfect seating of both valves. The principle of compensation depends upon the unwanted force acting upon two equal and opposite surfaces.

It soon was realised that the pressure of the gas itself could be harnessed to accomplish its own control; and there emerged the auxiliary rail, or pilot rail. This consisted of a small pipe led from the inlet to the main governor to a small auxiliary governor which reduced the pressure to a workable figure above the desired outlet pressure. Thence, the gas passed through a needle valve and was led to the underside of the diaphragm of an auxiliary bowl. It continued through a second auxiliary governor to the outlet of the main governor. This second governor is the key governor, and the amount of gas allowed to pass through it determines the pressure in the auxiliary bowl, the diaphragm of which is connected indirectly to the spindle of the main governor valves, which can thus open and close in accordance with the position of the auxiliary bowl diaphragm.

If the second auxiliary governor is set to give the desired outlet pressure, and if the auxiliary rail cannot pass sufficient gas to maintain this pressure, the main governor is opened through the agency of the auxiliary bowl, so satisfying the demand. When the load is at its lowest, the small pilot rail can pass all that is necessary and when the load is *nil* there is a positive pressure in the auxiliary bowl which keeps the main governor valves closed.

### Catering for Peak Demand

With this arrangement a pressure differential across the governor is required and the working pressure in the auxiliary bowl must be greater than the maximum outlet pressure. This has two disadvantages. The pressure differential may be critical at times of peak demand when the inlet pressure is at its minimum and the outlet pressure at its maximum, so that a minimum inlet pressure equal to the outlet pressure plus the differential pressure must be maintained. If the inlet pressure falls to a figure less than this, the working pressure in the auxiliary bowl will fail and allow the main governor to fall wide open. Obviously it is bad practice to have a governor which is not governing, and, equally, the smaller the differential required to keep the governor floating the less frequently will such a governor fall open. These difficulties were ingeniously met by the Bryan Donkin Company with their patent inspirator. This in effect substitutes the positive action of inspiration for the negative action of a drop in presssure and enables a governor to function with an almost negligible differential—namely 1 in. w.g. —and keeps the governor operative when the standard governor would fall open.

On large governors the inspirator can be taken to the underside of the main governor diaphragm without the

(*Continued on p. 472*)

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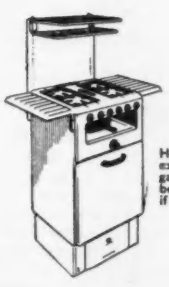

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use of an auxiliary bowl. When this is done the main diaphragm is top-loaded with outlet pressure and with this arrangement the governor can never fall open.

Once the principle of utilising the pressure of the gas stream for operating the governor had been established, it was a relatively simple matter, by utilising an orifice plate in the main, to make the governor pass a constant flow instead of a varying flow of constant pressure. There are many cases where a volumetric governor better serves the local purpose than a pressure governor, but it must be said that in-so-far as it fails to assist in supplying consumers at a constant pressure, it is less to be preferred than the pressure governor. Basically, the volumetric governor responds to the differential created by an orifice plate in the main and can be set to pass a given volume of gas per hour with a varying outlet pressure.

## District Governors

District governors feed the consumer's mains from medium or low pressure feeder mains. They are mostly of the Reynolds type—that is to say, they employ an auxiliary system to obtain the desired result and the necessary sensitivity. They are housed in pits, in kiosks, and in houses. They are marked by two characteristics—general reliability and the fact that no two governors work under exactly the same conditions of flow and pressure. It is this latter fact which makes it necessary to design each governor for the particular conditions under which it is intended to work and it is for this reason that the majority of distribution men prefer the 'tailor made' to the 'off the shelf' article. The fixed differential governor is a simple diaphragm type governor used to reduce the increase in pressure occasioned by altitude in hilly districts and so maintains a varying outlet pressure less than the varying inlet pressure by a fixed amount.

## Inlet Pressure Regulator

This is a governor interpolated on a feeder or trunk main. It safeguards the pressure on the inlet side. For instance, if gas is picked up at a district station and boosted on to a further point, and if the supplying main has commitments between the works and the district station, the pressure in that main must not be allowed to fall below a predetermined minimum. This can readily be calculated and an inlet pressure regulator can then be installed on the inlet to the booster to prevent it from draining the district behind it.

The excess pressure regulator is a governor which is normally closed. Its function is to relieve pressure on its inlet side when this reaches a predetermined maximum. It is installed in a by-pass across district boosting machines and prevents over-boosting when, for instance, a distant storage station is full up, or when, for any other reason, the demand falls away.

## High Outlet Pressure Governors

The high outlet pressure governor is a cousin of the Reynolds type governor, but has piston-type auxiliary governors in order to deal with higher pressures. The movement of the main governor valves is reversed—that is to say, the valves fall to close. Their movement is actuated by a differential pressure given by a needle valve in the auxiliary rail and acting through an auxiliary bowl. This type of governor is used wherever it is necessary to reduce a high pressure to a lower pressure which is still a high pressure. Where high pressure storage is employed on district stations fed from a high pressure system, this type of governor will be used for back feeding from the pressure vessel to the high pressure main. In such circumstances the inlet pressures would be of the order of 50-70 lb. per sq. in. maximum and outlet pressure 5-10 lb. per sq. in.

Service governors may be high pressure, high-low, or low pressure. They are generally simple in design, operated by outlet pressure, and may be weight or spring loaded. Compensated valves are generally considered necessary since pressure variations in the installation pipes may be considerable and give rise to the need for a good performance of the governor itself.

Appliance governors are small, compact, relatively trouble-free, and simple in design. They are the key to efficient performance in all appliances, particularly where any form of automatic heat control is used. The modern appliance governor in the smaller sizes generally has a single valve and is weight loaded. It will give long service without maintenance, although this attribute can be affected by the gas characteristics.

## A Product of Growth

Distribution systems are rarely, if ever, planned entities. They are rather the product of growth which is conditioned by the expansion of the communities they serve. Many factors bear on this growth, leaving the imprint of their influence and not infrequently problems for the future. Among these factors may be mentioned the type of community, the relative size of various types of load, industrial, domestic, catering, etc.: the rate of growth over the years, the geographical peculiarities, the capital resources available, the financial policy adopted, and even the differing ideas of successive engineers. The first system with which the author was associated was in a coastal town of a mainly residential character, with a low population density figure and an ultra-rapid rate of growth. The early distribution system, therefore, not unnaturally tended to become over-loaded, the mains being of relatively small sizes. Moreover, the progressive taking-over of neighbouring small undertakings made available a number of district low pressure storage stations. In these circumstances, the transmission of gas was by high and medium pressure, serving the main built-up area through district governors and the outlying townships through the district storage stations with gas from the pressure mains augmented by the local low pressure storage.

District pressures were relatively high, and against this background district governors, inlet and excess pressure regulators, were all to be found incorporated in the system, as well as service governors. Governors were fitted to all appliances, to the very great benefit of consumers.

[At this stage in his paper Mr. Healey referred to two distribution systems in South America—those of Rio de Janeiro, where the twin task of feeding the supply area and maintaining constant pressure was accomplished mainly by Reynolds type governors; and of San Paulo, where the distribution is effected by a ring main high pressure system feeding the low pressure network through some 60 Reynolds type high pressure district governors.]

If the two-fold function of governors is remembered—namely, to feed gas into the low pressure network and at the same time to control its pressure, there is a case to be made for too many rather than too few district governors. They can be so sited as to support each other, thus doing away with the necessity for standby plant. They can also take care of changes in the demands of particular districts within the area of supply and they will still be able to keep district pressure variations to a minimum. If, on the other hand, fewer stations with larger governors are used, standby governors become a necessity to deal with emergencies and it will be found more difficult to keep control of the district pressures. Alternatively, service and/or appliance governors can be used for controlling pressures, with the advantage that they do so at the point of combustion, leaving the works and district governors with the single job of feeding the gas to the consumers. In either case it would not appear possible to arrive at any formula for the siting of governors, in terms either of density per unit or area or per thousand consumers, since existing factors such as the feeder mains available and the pressure in those mains will largely influence a decision in any given case. Moreover, any such formula would need to take account of the economic factors.

# DISCUSSION

**Mr. R. W. Nelson** (Birmingham) thought that the paper would promote a new interest in governors. The governor was very necessary, but little attention was paid to it. He appreciated the difficulties that must exist in Rio de Janeiro and San Paulo because of the height of the buildings and the hilly terrain. As regards Birmingham, he suggested that closer spacing of governors might prove useful.

**Mr. Healey** replied that closed spacing of governors could

e awkward because of pressure conditions on the off-peak eriods.

**Mr. S. Brockbank** (Newcastle-under-Lyme) spoke of the difficulties of obtaining spares and replacements, and asked whether liaphragms used in South America were made locally or mported. The failure of leather seatings was a common complaint, and he used rubber seatings to overcome the difficulty.

**Mr. Healey,** replying, said that the governors used at Rio nd San Paulo were American type. Some spares were imported; others were obtained locally. Local leathers were used, and although they had not the durability of those in this country they proved quite satisfactory.

**Mr. B. G. H. J. Hawkings** (Coventry) expressed surprise at the development of high pressure systems in Brazil.

**Mr. Healey** said that there were two high pressure district storage stations, each comprising a battery of six zeppelin type holders. The high pressure system had developed in Rio de Janeiro because of the rapid growth of the city. During the last 20 years an amazing number of skyscrapers had been erected.

**Mr. W. A. Cope** (Northampton) enquired if the gas was dried in Brazil and if any dust trouble was experienced. He stressed the need for regular maintenance, and felt that there should be a standard schedule arranged for this.

**Mr. Healey** replied that no dust troubles were experienced in Brazil, and that the gas was not dried. Agreeing with Mr. Cope that there should be regular maintenance, he added that in Brazil the governors were in underground pits, each of which had two manholes for access. A crew manning a lorry, equipped with an airpump, attached a vent to one of the manholes and cleared the gas before descending to carry out maintenance. Labour was cheaper there, so crews were plentiful, but the amount of work done per man per day was less than in this country.

### Alternative Types of Governor

**Mr. G. W. F. Cockayne** (Wolverhampton) commented that the author had explained the use of the Reynolds type of governor. There were, of course, other types which were equally effective. He (the speaker) suggested that district governors should not be fixed in underground pits, but should be installed in brick buildings adequately heated. This system resulted in easier maintenance. In the past the industry had tended to favour the dual governor; in his opinion the single pattern was effective and cheaper.

**Mr. Healey** agreed that there were other governors as satisfactory as the Reynolds type. He did not think it necessary that governor houses should be brick built, though he was very much in favour of their being heated in this country. He mentioned that kiosks were now being made with detachable sides to enable maintenance to be carried out easily.

**Mr. F. L. Atkin,** in proposing the vote of thanks to the author, said that Mr. Healey had, in the limited time at his disposal, dealt with the subject in a concise and admirable manner.

**Mr. G. W. F. Cockayne** (Wolverhampton) seconded the vote, and **Mr. Healey** briefly replied.

## COMBINATION OF COKE

AT the sixth conference of the British Coke Research Association held in co-operation with the Coke Oven Managers' Association Dr. R. A. Mott discussed the effect of the physical and chemical properties of coke on its combustion. In all processes of combustion involving coke, he remarked, the physical qualities of coke tend to dominate the so-called chemical factors.

The physical factors are: size, including the geometry of coke particles involving the values of length, breadth, and width, the projected area, the volume and the surface area; porosity, and its implications; and strength, including the effect of fissures and the resistance to breakage by impact and abrasion. The chemical properties include the purity and the ultimate composition of the mineral-matter-free coke.

The physical factors affect the permeability of beds of coke, and of the particles themselves, though the porosity of coke, one of its most obvious visual properties, plays little part, except in determining the surface conditions in combustion processes. Particle size in practice dominates the combustion of coke and other factors have less effect.

From such considerations desirable size characteristics can be postulated for the particles in the hearth of a blast furnace, and in the grate of a slow-combustion stove. The relationship to coke strength may be traced.

## GAS COUNCIL FILM AUDIENCES

AUDIENCES who saw films issued by the gas industry last year totalled 4½ mill.—four times the number a few years ago. The Gas Council contends there is still a vast audience not yet reached. The gas industry was one of the pioneers in the use of non-theatrical films and figures released by the Gas Council reveal the astonishing increase in the distribution of its films. Last year, for instance, 10,000 copies were issued. Furthermore, many films were sent overseas which necessitated making foreign versions.

The bulk of the audience—amounting to 3½ mill.—was reached by films distributed by the Council's Film Library. The rest saw shows arranged by local gas boards, who last year gave 12,000 screenings using 77 of their own projectors. In addition, some boards used existing commercial projector facilities.

Detailed records compiled by the Gas Council show that, on average, each film booked from the library is screened 2½ times to 80 people at each performance. Some 70% of these bookings are to schools, colleges, and technical institutes, 20% to societies and social bodies, and the remainder to local government authorities, national and industrial organisations. While local boards prefer comedy films, those who borrow direct from the Council's library like their subjects treated more seriously.

The demand for the Council's illustrated film catalogue indicates the increased interest. In 1952, for instance, 700 copies were asked for; today the figure is 9,500. More than 20 films are listed in the catalogue and cover a variety of treatment, including coloured cartoon, straightforward instructional films, broad comedy, and dramatisation of national social problems.

But the increased interest clearly indicates the need for greater production. At present the Gas Council has 23 reels of new films in course of preparation or production, including instructional films on the manufacture and utilisation of gas (made primarily for use in schools) and a three-reel general interest film in Technicolor. Several film strips are also in production.

A new departure this autumn is six entertaining and instructive one-reel magazine films in which audiences are taken behind the scenes to see people and places from unusual angles.

## MECHANICAL PROPERTIES OF STEELS

AT the autumn meeting of the Société Française de Métallurgie observations on the yield point of steels were made by M. de Strycker, who, by means of a tensile machine with variable loading, has studied the deformation of annealed mild steels in the region of the lower elastic limit. The phenomenon of ageing is accompanied by an increase in the lower elastic limit, at first fairly rapid and then relatively slow, but still persisting for periods similar to those during which the formation of Cottrell atmospheres can be observed. Steels of various compositions, which have been submitted to heat-treatments not ensuring almost perfect homogeneity, undergo, after a first deformation, ageing, and increase of load, fresh deformations which vary almost regularly with the logarithm of time.

A note on the use of steels in a state of multi-dimensional stress and at elevated temperatures was given by M. Siegfried. He stated that there were not at present anything like enough results of tests giving sufficiently precise information on the permissible stresses in machine components working at high temperatures and under irregular multi-dimensional stresses.

Depending on the brittleness of the material, two types of rupture can be distinguished:—(i) Rupture by sheer stress—in the planes of maximum shear stress, the material gives gradually until its capacity for deformation is exhausted. For this type of rupture, one can indicate a nominal shear stress and the quality of a product can be expressed by a factor depending on the shape and the material of construction. In the case of a rupture of this type, a qualitative agreement is found between the results of mechanical tests at room temperature and those of creep at high temperature. (ii) Rupture by brittle fracture—this rupture has its origins in an area submitted to a tensile stress concentration. In this case, no relationship is found between mechanical tests at room temperature and those of creep at high temperatures.

THE Scottish Fuel Efficiency Committee is to ask the National Coal Board to consider the establishment in Scotland of a plant for the production of smokeless fuel. Following a meeting of the Committee, Sir Patrick Dollan, Chairman, said that complaints had been received from many consumers that supplies of smokeless fuel were not equal to the demand.

# ..RENOWN-FIVE

See that double grill. It cooks a meal for 6 and the insulated canopy means extra safety.
Look at that beautiful grill tray, it can be used as a serving dish.
The loveliest cooker of all. With flush fitting tap handles.
The easiest cooker of all to clean . . . and to keep clean.
Fits flush to wall, no wasted space, no dirt traps.
Extra large oven, with safety pattern automatic lighting. Large warming chamber.

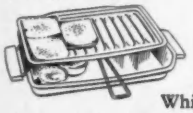
# the most advanced gas cooker in Britain today

*. . . never before have so many worthwhile features been built into one gas cooker*

IT'S here . . . the Parkinson Renown-Five . . . representing the greatest single advance since 1936, when the original Parkinson Renown set the style of to-day.

**EYE LEVEL TWIN-GRILL**

Two independent grills give the Renown-Five a grilling area of 94 square inches. For the first time on a domestic gas-cooker it is possible to cook a mixed grill for six people in thirty minutes.

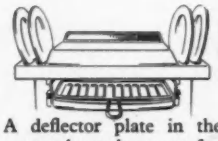


**"DOUBLE DECKER" GRILLING . . . no wasted heat**

Whilst the twin-grill is being used, food may be baked underneath on the grill tray.

**UNIQUE GRILL TRAY**

Designed to take the food piping hot from the twin-grill to the table.



**NO WALL STAINS**

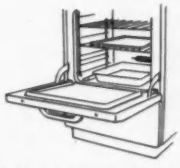
A deflector plate in the insulated grill canopy keeps hot gases from the oven away from the wall. The canopy has a built-in plate rack.

**WHITE ENAMELLED HOT PLATE . . . so easy to clean**

Like the rest of the cooker, the hotplate is in gleaming white, vitreous enamel. The cast-iron pan supports in easily cleaned, grey, vitreous enamel provide a pleasant contrast.

**NEW STYLE TAPS & AUTOMATIC LIGHTING**

Both grills, all four hotplate burners and the oven are lit by turning the appropriate tap.

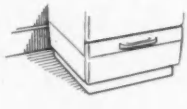


**EXTRA LARGE OVEN with AUTOMATIC LIGHTING**

Nearly 6,000 cubic inches of oven space. The oven is lit automatically but a safety device prevents this happening without first opening the oven door.

**WARMING CHAMBER OR STORAGE DRAWER**

Special rack takes 6 full size dinner plates and other dishes.



**FITS FLUSH TO WALL**

No wasted space, no dirt trap, the Renown-Five fits flush to the wall.

PARKINSON

## RENOWN-FIVE

*It's here . . . to set the style for the years ahead*

THE PARKINSON STOVE CO. LTD., STECHFORD, BIRMINGHAM, 9 *A member of the Parkinson & Cowan Group*

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# GAS PRODUCTIVITY TEAM

***Report discussed at a meeting of the Eastern Junior Gas Association held at Colchester on October 28, 1953***

THE Eastern Junior Gas Association met at Colchester on October 28 to discuss the Gas Industry Productivity Team Report. The discussion, under the Presidency of Mr. F. J. Denny, was confined to the section dealing with education and research, dealt with by Mr. A. G. Higgins, Assistant Secretary of the Institution of Gas Engineers, and Dr. A. Marsden, M.B.E., Area Scientist of the South Western Gas Board, respectively. Mr. J. H. Dyde, Leader of the Team, opened the proceedings.

**Dr. A. Marsden** said it was stated that the A.G.A. had a research programme on which $750,000 was spent annually, some of the work being carried out by universities and some by manufacturers' research associations. The A.G.A. had pursued some research since 1923, but it was not until the end of the second world war that research was organised under the P.A.R. (Promotion—Advertising—Research) scheme. Briefly the function of A.G.A. research—as stated by T. L. Robey, Secretary, General Research Planning Committee—was to investigate the problems common to large segments of the gas industry that were too big, too complicated, or too expensive to be undertaken by individual companies, or conducted by personnel engaged in maintaining gas supplies and service.

In 1951 there were 14 projects in progress on gas production research and all were concerned with problems of immediate or future impact, because they had an eye on the possible depletion of natural gas reserves and much capital was already being put into possible processes for synthetic gas, particularly by the complete gasification of coal. The test plant working at Chicago was using oxygen at 30 cents per 1,000 cu.ft., although one firm had stated it was prepared to reduce the price to 15 cents. Captain E. S. Pettyjohn—Director, I.G.T.—told the Team that much effort was being devoted to the production of natural gas substitutes, particularly from coal, and that 60% of the I.G.T.'s research activities were concentrated on that problem. Work was also in progress on the catalytic activities of various elements with the object of producing sulphur-resistant catalysts. Among nine projects in general technical research dealing with natural gas production and transmission were 'Pipeline Flow' and 'Orifice Meter Installation.' Emphasis in utilisation research—domestic, industrial and commercial—was said to be shifting to the three basic problems which were never present with electrical appliances—venting, ignition, and combustion.

## Certificates of Approval

The Americans took a broad view of research. Mention was made of the work seen in progress at the Los Angeles laboratories of the A.G.A. The laboratories were divided into two main sections, one for appliance testing and the other set apart for the convenience of appliance manufacturers, who were provided with facilities for gas appliance adjustment prior to an initial testing, but no development work was permitted. The facilities were free for the first three days after which a charge was imposed. The A.G.A., after testing, issued a certificate of approval in respect of the appliance concerned, but released no details of performance tests to the manufacturer, those being regarded as the confidential property of the A.G.A. and used for checking appliances and accessories from the production line from time to time. Normally, two such checks per year were carried out on each type of appliance or accessory, one being after notice had been given to the manufacturer concerned and the other without such notice.

If, during the course of such tests, any alterations were discovered the A.G.A. inspectors were empowered to agree them if from experience they were able to ensure that the appliance or accessory was unlikely to infringe any of A.G.A. requirements, but any major alteration on any new development was submitted to a working committee upon which gas undertakings, gas appliance manufacturers, insurance authorities and other interested bodies were represented.

Recently, on account of damage to appliances in transit which was stated to have reached a value of $10 mill. in 1949, the Los Angeles laboratories had developed dropping, vibrating, and checking impact test machines, and standards of packing were being developed. If packages passed those tests, an appropriate stamp was issued. The tests were designed to reproduce as nearly as was practicable the conditions likely to be encountered in transit.

Dr. Marsden's considered opinion was that the ability of our research workers and the quality of their work was not surpassed by the Americans. However, one could not fail to be impressed by the readiness with which costly equipment was made available to ease the work of their investigators.

In recent years there had been a remarkable development of the U.S. scientific apparatus industry, in the production of refined testing equipment, and of physical methods for rapid chemical analysis, by means of the direct-reading spectrophotometer. It should be noted, however, that sanction had been obtained to purchase such equipment as was not manufactured in Europe for the laboratories of the D.S.I.R. and the industrial research associations, and contracts had been placed for some 140 items, costing $670,000.

The probable trends of fundamental research in the gas industry of both the U.S.A. and this country, during the next decade or two, would be concerned with common basic problems, among which complete gasification and the synthesis of methane had high priority, although our need at present was not so much for a synthetic gas as the Americans understood it, but rather for a town gas of 500 B.Th.U. per cu.ft.

## Providing Trained Personnel

**Mr. A. G. Higgins** said that most of the gas companies visited by the Team were large enough to be able to provide from their own financial resources the education and training facilities appropriate to their particular requirements. That procedure, which was typical of the American individualistic outlook, appeared to be capable of providing the trained personnel required for the rapidly expanding gas industry. There were no counterparts in the United States to the schemes of training and examination operated on a national basis and sponsored by the Institution of Gas Engineers and the City and Guilds of London Institute in this country. This was a matter which he had sought to discuss with several American colleagues responsible for education and training, and while they felt generally that the individual system was, on the whole, more satisfactory from their point of view, there might well be an advantage in having a nationally conducted qualifying examination for technical personnel, particularly in connection with the state registration boards. Most of the American states now had a system whereby engineers must be registered with the state registration board, for which purpose they had to satisfy certain academic and professional requirements. Some states accepted the qualifying examinations of the registration boards of other states, but others did not, so that in movnig from one state to another a registered engineer might well have found it necessary to take another qualifying examination in order to be registered in the second state. Although it was not absolutely essential to be a registered engineer in order to obtain suitable employment, the Team encountered certain gas companies which required their senior engineers to have passed the state licensing examination and there seemed to be a case for the initiation and adoption of an examination comparable perhaps with the Associate Membership Examination of the Institution of Gas Engineers, which could be operated on a national scale and would be acceptable to the registration boards of all states. This was one of the recommendations made by the Team.

The Institute of Gas Technology, which was affiliated to the Illinois Institute of Technology, Chicago, afforded an excellent example of collaboration on a national basis in the gas industry in America in the fields of education and research. In many ways it closely resembled the Livesey Chair of Gas Engineering of the University of Leeds which was founded by the Institution of Gas Engineers and towards which the British gas industry subscribed.

## A Recent Innovation

The Utility Management Workshop of Columbia University, New York, was a recent innovation and at the time of their visit was not actually in operation, although the programme for the first course conducted in the summer of 1952 was practically settled and he had since been sent a copy of the report on that course. The Workshop was initiated to provide a means of training men to replace the senior officials of public utility companies as they reached retiring age and was accordingly a course in which all the public services (gas, electricity, water and telephonic communications) collaborated. The scheme was originally proposed by a group of senior officials of certain utilities in New York City, but preliminary discussions in which the American Gas Association played a prominent part, led to the decision to widen the field, and in point of fact, the 25 men who attended the course were drawn from all parts of the United States.

Referring to the kind of training provided by some of the gas companies for their own personnel, Mr. Higgins said so far as technical training was concerned many more young Americans were able to go to a university than was the case in this country, and consequently most, but not all, of the

technical personnel were recruited as graduates. It was the custom of large industrial companies—not only gas companies —as a means of easing the transition from college to industrial life, to provide courses of training for the work to which those graduates would be assigned.

The larger companies had workshop centres and training establishments which were kept fully occupied with the provision of special courses for the various types of personnel employed. Those workshops and training centres they were able to inspect were generously equipped with apparatus and visual aids for teaching. An interesting feature of some of the American training establishments was the provision of courses for the employees of approved dealers and plumbers to whom the service work of the undertaking was entrusted.

## The Conference Technique

**Mr. V. A. Bignall** (Ipswich) asked if the Team had in mind the use of the conference principle for management courses only, or also as a means of fostering the development of personnel as a part of the day to day administration in the various boards' areas.

**Mr. Higgins** said there had been envisaged the application of the conference technique for training, in due course, of all grades of personnel and as a means of imparting knowledge of the policy and activities of the boards generally. The word 'management' in America meant from the foreman upwards. It was not possible to extend the conference technique to all grades at once, and, as had already been indicated, this type of training could be very expensive if allowed to get out of hand. The idea was to encourage people to help one another by exchange of views, and by discussion with an authority on any subject on the round-table principle

**Mr. E. B. Briggs** (Ipswich) said the technical staff recruitment in America appeared to be from the university-qualified ranks, and, to a lesser extent, from high school graduates. The former embarked upon the cadet training system; the latter qualified by evening class or similar study. Was there a marked difference in those two groups of personnel in attainment, particularly where, 'a few companies employ graduates and rely on their acquiring the company's technique without special training?'

**Mr. Higgins** said it was difficult in America to differentiate between the man who had advanced from the ranks and the man who came from the university.

**Mr. Dyde** agreed with him. They had met vice-presidents in America who were very pleased to relate that they had started from the lowest rung of the ladder in their company's organisation. The term 'vice-president' in their organisations was broadly equivalent to a senior officer in charge of a functional department in our area board organisations. The chances of a graduate because of his wider educational training were on the whole rather better in aspiring to such positions than by rising from the ranks.

**Mr. Briggs** asked if 'refresher' or similar courses were conducted for groups of individuals, especially where new techniques had been inaugurated.

**Mr. Higgins** said there were. Refresher courses were incorporated in nearly all the educational schemes.

**Mr. F. G. Cox** (Norwich) asked whether in America there was any equivalent of the British Junior Gas Associations existing for the benefit of executives through the presentation of papers and interchange of ideas?

**Mr. Higgins** replied there was not. There was the American Gas Association, which in addition to its general meetings arranged conferences on specialised subjects such as distribution, transport and production, but which did not differentiate between senior and junior officials.

**Mr. Cox** said it was evident from the report that in America great emphasis was laid on training at all levels, from school leavers to heads of departments, and it was thought that this must entail the maintenance of considerably more permanent instructors than in this country. He asked if Mr. Higgins could give some idea of the number of permanent instructors employed in relation to the size of undertaking.

**Mr. Higgins** said that contrary to expectations, the Team found the system in America did not use full-time instructors to anything like the extent they were used in this country.

**Mr. Dyde**, giving the Chicago company as an example, said each of the heads of department had to take as part of its duty lecturing to groups of employees at regular intervals. Each head of department, within the course he organised, had to take on the job of bringing the work of his department to the notice of his and other staffs. The liaison was of particular advantage when there were changes of policy and when it was necessary that the information should be disseminated throughout the whole of the companies' organisation.

**Mr. R. W. Hilham** (Colchester) said there appeared to be no equivalent to our City and Guilds Examination for craftsmen. Appliances were fitted, serviced and maintained by dealers and he wondered how the American industry controlled appliance standards, methods of fixing, etc. Were codes of practice used and standards of dealers' workmanship controlled by local examination?

**Mr. Higgins** replied that there were a number of ways in which the gas industry in America controlled standards of fitting, which was, in the main, put into the hands of the dealers. There was a fairly widespread organisation working under the ægis of the American Gas Assocaition which drew up requirements. He showed Mr. Hilham various documents on the subject. There were codes of practice which could become legal if the gas companies made them part of their contract. The gas companies had classes for instruction in gas fitting, to which contractors and dealers were invited to send their personnel. The city authorities had licensing requirements. They licensed builders' contractors, heating and ventilating engineers, etc., and had certain requirements for fitting in respect of which they consulted the gas companies.

**Mr. Rudge** (Lincoln) asked Mr. Higgins for his views on the value of management training. He felt that a certain amount of training for management was essential and wondered why training of this kind was not included in the Institution of Gas Engineers' examination for Associate Membership. A suitable course of study was included in Section 'C' of the Institution of Mechanical Engineers' examination and he suggested that this might be a 'joint' examination.

## Training in Management

**Mr. Higgins** said that so far as the value of management training was concerned he fully endorsed all that was said in the report. He did not feel that the Section 'C' examination of the Institution of Mechanical Engineers was at all appropriate for gas engineers. It was eminently suitable for engineers engaged on large-scale production work and its workshop technology and industrial administration were admirable for this purpose, but he did not feel that they had the same significance for production or distribution engineers in the gas industry.

**Mr. R. Wells** said it was noted in the report that there was no national scheme in respect of training and examination by the American gas industry. What, therefore, were the requirements for admission to membership of the A.G.A.?

**Mr. Higgins** said the American Gas Association was not at all like the I.G.E. It was more like the former British Gas Council. It was a fact finding, co-ordinating group, sustained and directed by individuals and companies of the gas industry. It was possible to be an individual member of the A.G.A. or for a company to be a member. Unlike the I.G.E., membership of the A.G.A. carried no professional qualification. Membership meant nothing more than paying a subscription and taking part in the discussions and activities of the Association.

**Mr. D. G. Wright** (Ipswich) said that research in the American gas industry was co-ordinated by the General Research Planning Committee. Were the activities of that body similar to those of the former Gas Research Board? It was apparent from the report that the scale and effects of research in the American gas industry exceeded that in the British gas industry. Was this because the American industry was more aware of the necessity for research or merely a direct result of careful applications of the results of research?

**Dr. Marsden** said that in general terms the activities of the General Research Planning Committee and the former Gas Research Board were similar, bearing in mind the fundamental differences in the gas industry background in the two countries. Concerning the second question, Dr. Marsden said he would not say that the American gas industry was more aware of the need for gas research than in Great Britain.

At the conclusion of the discussion, **Mr. Denny** thanked Dr. Marsden, Mr. Higgins and Mr. Dyde, and said the conference had been most successful and interesting.

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## CATHODIC PROTECTION

CORROSION of underground water pipelines alone is estimated to cost this country at least £5 mill. each year. One of the ideas for combating this corrosion which has been investigated in Britain and other countries is cathodic protection. This is a method of using small electrical currents which divert the effects of corrosion to expendable scrap metal buried nearby. A book on the subject has recently been published in Russia, and an English translation of it is now available.

The book, which is liberally illustrated with diagrams, deals with the theory of the subject and provides practical details on the method of carrying out this type of protection. It should be a valuable guide for scientists in industry concerned with this particular problem, and is also a practical manual for those who have to translate theory into practice. Of particular practical help is the attention which has been given to methods of calculation required for various types of installations.—'Cathodic Protection of Pipelines and Storage Tanks,' by V. A. Pritula, is published for the D.S.I.R. by H.M. Stationery Office, price 10s. ($2 25 c. U.S.A.), by post 10s. 6d.

# IN PARLIAMENT

Matters concerning fuel and power received notable mention in the Queen's speech at the State Opening of Parliament on November 3. Among the new Bills mentioned were five proposals to secure respectively:

(1) Transfer of responsibility for atomic energy from the Ministry of Supply to a statutory corporation;
(2) to revise, consolidate and extend the law on the safety, health and welfare of miners and quarrymen;
(3) to provide benefit for certain further cases of disablement from industrial diseases;
(4) to restrict night working in the baking industry; and
(5) to organise electricity supply in Scotland.

### *Atomic Energy*

During the Commons Debate on the Speech, Mr. C. R. Attlee (Lab., Walthamstow West) said the proposal to transfer atomic responsibility to a statutory corporation aroused his gravest doubts. Atomic energy was of supreme importance from the point of view of defence and economics. It did not seem to him advisable that policy in this matter should be handed over to people who were not responsible to Parliament.

Nobody supposed that atomic energy would pay for a long time, Mr. Attlee continued. It would be heavily subsidised by the Government, and, therefore, the House ought to be in control. He understood that one hope expressed was that there would be greater freedom in getting the services of scientists for atomic energy. The difficulty was a great competition for scientists of highest rank for economic energy, and for guided missiles, and it had been extremely difficult to get allocation of this scarce skill. Therefore, it seemed to him much better that the matter should be kept under the hand of the Government.

In the House of Lords, in the debate on the address in reply to the Queen's speech, Lord Glyn expressed the hope that when the question came up of the use of atomic energy it would be turned to the great advantage of all our people. 'This might mean tasks being accomplished,' he said, 'in a way that has never been thought of before, with savings of fuel and power, thereby rendering more easy the productive effort of this country.

Viscount Hall agreed with Lord Glyn that this new source of power, if properly used, will inaugurate an entirely new era in world production. 'If used as we now know it can be used, then it must soon have a direct effect on the peaceful pursuits of the people of this country, and, indeed, of the world. This discovery is most timely for Britain. With little indigenous oil, meeting difficulties in coal production and having a concentrated industry, and with the need for increased productivity, we are a nation which will clearly gain considerably from the application of this new source of power production.

In the House of Commons on November 9 Mr. D. Sandys, Minister of Supply, replying to questions by Mr. G. Nabarro (Con., Kidderminster) on the need to explore the United Kingdom's resources of uranium and other materials required for atomic power production, explained that the country's geology has been mapped in greater detail than any other area in the world of comparable size. Cornwall was the most promising region, but the quantities so far found would not justify the expense of mining and treatment. Reliance on overseas deposits was, therefore, a question of necessity.

*The Minister was glad Mr. Nabarro had drawn attention to the suggestion that, under the Gas Council's plan to spend £1 million on boring to depths of 6,000 to 7,000 ft. in the search for resources of natural gas—a greater depth than in any previous geological exploration*—the possibilities of searching for uranium at the same time should be kept in view. Mr. Sandys had no doubt the exploration would also keep a look out for other valuable resources.

Mr. A. C. Manuel (Lab., Central Ayrshire) asked what geological survey had taken place in the Highlands of Scotland.

Mr. Sandys: 'What I said was that there had been a very thorough mapping of the geological formations in the United Kingdom.'

### *Air Pollution*

The increasing urgency with which the problem of air pollution should be tackled was emphasised by Earl Jowitt in the House of Lords on November 4. He urged the Government to take seriously the question of what was known to-day as 'smog.' He had looked up the extremely serious figures of three or four days' 'smog' last year.

'In the administrative County of London,' he said, 'the deaths of those under one year of age trebled; with people between one and twenty-four there was no appreciable difference; between twenty-five and forty-four they doubled; between forty-five and fifty-four they trebled; and from fifty-five upwards they quadrupled. In the National Gallery, of which I was a trustee until recently, we erected air conditioning for the benefit of the pictures, and in one period of four hours the pollution of the filters in the National Gallery was fifty-four times greater than it normally is. That is a very serious matter.'

Quoting a statement by Dr. Bronowski, whom he believed to be an eminent scientist in the employ of the Ministry of Fuel and Power, that they had now evolved a method of building up a smokeless fuel which gave greater heat from inferior coal, Lord Jowitt said: 'If that is so, I beg the Government to see whether they cannot undertake the manufacture of this type of coal on a large scale. It is not a question of spending extra money. I believe that in this way we might save money. Manchester (I think I am right in saying this) has had a smokeless area, where people may not burn raw coal. I saw in the Press to-day that the City of London was contemplating the same thing. In Pittsburg, in the United States, they have had a 70% reduction of smoke, and one of the leading industrialists has said:

"I was in on the planning of smoke control, and I can tell you that none of us realised the great spiritual uplift this would bring. If we had we would have been fighting for it long before."

'I look forward to the time when we may have a Greater London free from the frightful smoke which we have today. If we can do away with some of those sulphur oxides, we shall be spared a great deal of the cost which we have today—even in this building, where we see the stone being eaten into by the sulphur.'

Air pollution is being viewed with equal concern in the Commons. On November 9, Lieut.-Colonel Lipton (Lab., Lambeth Brixton) asked the Minister of Housing and Local Government what steps he will take to arrange for joint and immediate action by himself and the Ministers of Health and Fuel and Power to deal with air pollution in the London area.

Mr. E. Marples, Parliamentary Secretary: 'My right hon. Friends are giving close attention to this problem. They expect to receive the recommendations of the Beaver Committee shortly.'

This followed questions in the House during the previous week, in the course of which Mr. Geoffrey Lloyd, Minister of Fuel and Power, replying to Mr. Peter Freeman (Lab., Newport), who asked what steps are being taken to convert coal into smokeless and gaseous fuels, and so avoid the pollution of the atmosphere and make use of the by-products for fertilisers, dyes, drugs, motor-fuels and other purposes, said: 'Between 1946 and 1952 the consumption of coal for electricity generation has risen by 35.6% and the tonnage of coal carbonised by 24.4%. Included in the latter figure is an increase of 22% in the tonnage of coal carbonised by the gas industry, which is the principal supplier of solid smokeless fuel and gas for the general domestic and industrial market. These increases compared with an increase of only 1.7% in all other inland consumption of coal during the same period.

'The resultant increases in the availability of smokeless fuels produced from coal are shown in the following table:

| Fuel | Unit | 1946 | 1952 | % Inc. |
|---|---|---|---|---|
| Electricity | mill. kWh | 41,498 | 62,056 | 49.5 |
| Gas | mill.cu.ft. | 524,928 | 648,780 | 23.6 |
| Coke (total inland disposals other than to blast furnaces, foundries and gasworks) | tons | 11,910,000 | 13,130,000 | 10.2 |
| 'Phurnacite' and low temperature cokes | tons | 429,000 | 726,000 | 68.8 |

'All the industries are planning further substantial increases,' the Minister added, 'and work is also going on to develop new processes to convert a wider range of coals into smokeless and gaseous fuels.'

# News in Brief

**Gas Too Dear.**—At the monthly meeting of Huddersfield Chamber of Trade, Mr. G. E. Hill, Secretary of the Huddersfield Master Bakers' Association, revealed that, owing to the high cost of gas heating, members of his Association were to be addressed by an expert on oil firing. He added that one or two members had already changed over from gas to oil fuel, as it had been found that work which cost £4 to £5 where gas was used could be done for 35s. to £2 where oil was used.

**The Inaugural Sales Conference** of the Wakefield-Dick Industrial Lubricants Division of C. C. Wakefield & Co., Ltd., took place at Liverpool on October 15 and 16 under the chairmanship of Mr. R. J. Turner and Major Cyril Dennis, Joint General Manager of the Division. An important feature of the conference was a visit to the company's new Stanlow installations, where the delegates were conducted round the plant in several parties. This tour was followed by talks by A. V. Jay, Manager, Lubrequipment Department, and L. J. Field, Manager Mechanical Appliances Department, on the application of lubricating equipment in industry. The proceedings concluded with an informal dinner at the Adelphi Hotel, at which the speakers included the Joint General Managers and also Mr. M. Nichol and Mr. W. A. Hill, who spoke in appreciative vein on behalf of the field sales force.

**The Scottish Gas Board** is to construct a new frontage to its High Street, Arbroath, showrooms at an estimated cost of £1,600. Authority for the work has been given by the Dean of Guild Court.

**The Tubela Engineering Co., Ltd.,** Furze Street, Bow, London, E.3, has appointed sole distributing agents for its tube bending machines and other products as follows: Canada—F. J. Edwards (Canada), Ltd., 16, Watson's Drive, P.O. Box 72, Toronto, 18, Ontario (Telephone: BELmont 1-6411; cables: Bescotools, Toronto). Latin America—Rabone, Petersen & Co., Ltd., 4, Exeter Street, Holloway Head, Birmingham, 1.

**Boston Gas Consumers** were deprived of a supply for about 20 minutes one evening recently when it is believed a man crept into the gasworks and shut off the supply serving the town and surrounding district. Street lights, bakers' ovens, and domestic appliances went out, and when the gas had been turned on again police cars with loud speakers toured the neighbourhood and warned the public of the possible danger of escaping gas. Mr. R. C. Wardell, Group Manager, described the incident as a deliberate, highly dangerous act which might have caused loss of life and damage to property. A night guard has been mounted at the works.

**Lectures** for district representatives, foremen, and other sales staff of the Sheffield and Rotherham Division of the Eastern Gas Board on the subject of large scale equipment, were given on October 26 and November 2 by Mr. W. Parker, Area Manager of James Stott and Co., Ltd.

**Guy Fawkes Night** was chosen by an explosives gang as a suitable occasion to try to blast open a safe in the North Eastern Gas Board's offices at Huddersfield. A charge was inserted in the safe keyhole, and the explosion shattered the lock cover and jammed the door, but did not force it open. Members of the office staff were unable to reach the contents of the safe until employees from the safe manufacturing company had been sent to free and open the door.

**Reserves of Coal** in the North West are sufficient to keep the region's mining industry active for an indefinite period, according to a statement by Colonel G. G. H. Bolton, Chairman of the North West Divisional Coal Board, at a conference of fuel industry engineers in Manchester. As further advances are made in re-organisation schemes there are great hopes of achieving a regional output of 16 mill. tons a year—an increase of over 500,000 tons over the 1952 record.

## MANCHESTER JUNIORS VISIT DRAKES

*Manchester Juniors at Halifax. The front row includes J. Oates (President), H. B. Gidlow (Hon. Treasurer), T. W. Pickthall (Hon. Secretary and Group Production Engineer, North Cheshire Group), A. K. Howell (Past President), A. Cole (President, Yorkshire Junior Gas Association), H. Partington (Distribution Engineer, Oldham/Rochdale Group), C. H. Bamber (General Manager, Oldham/Rochdale Group), W. T. Hainsworth (Production Engineer, Oldham/Rochdale Group), H. G. Hall (Area Safety Officer), J. A. Drake (Chairman of Drakes, Ltd.), F. D. Drake (Director and Joint General Manager), and W. F. Raistrick (Joint General Manager).*

# Trade News

## A New Flow Meter

In the tradition of mercurial flow meters produced by George Kent since 1895 is their latest model, the 'KU.' Incorporating the most modern ideas in this field, it is the fruit of a concentrated design effort aimed at producing an even more thoroughly practical and highly accurate tool for industrial flow measurement and control. Moreover, it represents the first step in an important new policy of standardisation. This standardisation will embrace the 'presentation' mechanism of a new range of meters to be known as the 'Commander' class—*i.e.*, the case and front mechanism, including recording, integrating, indicating, and automatic control systems. The 'KU' is thus the first of the Kent 'Commander' class, and later additions to this class will use a variety of measuring elements.

Evidently, this policy will offer some notable advantages to the user, as he will be able to fit additional 'presentation' features to a meter, or interchange parts between one meter and another, and greatly reduce the number of spare parts kept in stock. Pre-calibration of relevant parts increases this flexibility by allowing the user to assemble a variety of instruments from standard units should he so desire, as well as alter ranges easily. The uniformity of appearance of the whole 'Commander' class, especially on panels, will please many people.

The 'KU' meter is available for the recording, indication, integration, and automatic control of the flow of oil, water, air, gas, steam, and most industrial liquids; and it works in conjunction with a Venturi tube, Dall tube, or orifice in the fluid pipeline. Its interchangeable mercury chambers are steel forgings, designed to receive maximum differential pressures of 25, 50, 100, 200, 400, or 600 in. of water (air-on-mercury basis). The 25-in. head chamber withstands a test pressure of 500 lb. per sq.in., and all other chambers 4,000 lb. per sq.in., the maximum working pressures being 250 and 2,000 lb. per sq.in. respectively. Special joints are used on the chambers. The nuts can be tightened with the fingers to hold the full test pressure. The new-design float (in the downstream chamber), subject of a patent application, rises for an increase in differential pressure. The extension of the U-tube is thus downwards, and the easily separable control head is a standard unit. Only a new upstream mercury chamber and U-tube are required for a range change, which can be made on site. An adjustable throttle valve in the downstream leg of the U-tube damps out the effect of a pulsating-flow characteristic. Streamlined over-load valves provide a safeguard against loss of mercury on excess or reverse loads. The control head includes two mild-steel forgings specially designed to reduce the number of joints in the instrument to a minimum. The movement of the float is carried to the 'presentation' mechanism through a grease-packed, hat-leather-type gland, designed to reduce friction to a minimum. A jewel thrust bearing is provided for the gland spindle.

The 'presentation' mechanism can accommodate up to two pens and a pointer, as illustrated, the second pen being for pressure measurement from a pre-calibrated Bourdon tube unit mounted in the case.—*George Kent, Ltd., Luton, Bedfordshire.*

## New Astral Refrigerator

A free standing refrigerator will shortly be introduced by Astral Equipment, Ltd., of 96, Buchanan Street, Glasgow, C.1. The new model is in addition to the company's table model and is not in substitution of it. Following the latest trend in refrigerator design, it is a good looker, has an internal capacity of 1.5 cu.ft., and makes available the bottom part as ordinary storage space.

*Our photographs show (left) the attractive exterior of the new Astral refrigerator, and (right) the storage arrangements.*

The whole exterior is constructed of zinc protected mild steel sheet, carefully finished in the best quality white stove enamel. The breaker frame has been formed entirely in one piece from the latest type of high impact plastic, and no screws are visible externally. The door interior is of special design in laminated plastic, finished in white stove enamel, and the handle, catch, hinges, and gasket have all been designed with a view to long and efficient service consistent with fine appearance.

Dimensions are as follows: Height 36 in., breadth 20¼ in., and depth 21¼ in. Internal dimensions are: Height 16¾ in., breadth 14¼ in., and depth 10¾ in. Shelf area is 3½ sq. ft., the two wire shelves having been designed so that a variety of shelf arrangements is possible, and the model has two ice trays making ¾ lb. of ice. Fitted with an absorption unit, thermostatically controlled, the gas consumption is $\frac{1}{10}$ therm per day. It is also available for electricity or butane operation.

Astral Equipment, Ltd., announce that the cooling unit is guaranteed for five years, and the cabinet and allied parts for one year.

## Socket-Welded Pipe Fittings

The almost complete reliability of modern welding, when backed by suitable inspection and radiological facilities, has led to a great increase in the use of welding for building up pipework. To meet this trend, the range of SPA screwed unions has recently been enlarged to include socket-welded unions from ¼ in. up to 2 in. nominal bore.

These new SPA unions will be made from a grade of hot forging similar to that employed for SPA screwed unions.

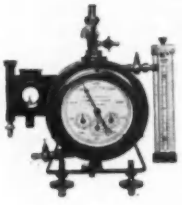
The materials of which SPA socket-welded unions are made has the same co-efficient of thermal expansion as the associated pipes, so that the two can be readily welded together.

All SPA unions can be provided with inserted bronze seats or with the seats as an integral part of the union. In the inserted types, the seats are pressed in and secured by a special spinning process which effectively prevents their working loose. All-steel unions are recommended to avoid pitting due to electrolytic action whenever the piping carries liquids containing traces of sulphur, sulphuric acid, ammonia, etc., and they should also be used on superheated steam lines. All unions are given a rustproof finish by Parkerising.

Details relating to application are available from *Shay Products, Ltd., 17, Little St. Leonards, Mortlake, S.W.14.*

## New Precision Instrument

Alder & Mackay, Ltd., have added to their range of wet leakage meters a new precision instrument with a drum capacity of 1/50th cu.ft. per rev. It is also available for metric measurement.



Constructed on the reverse-action principle, this little meter affords precise readings over a range from 1/50th cu.ft. to 3 cu.ft. per hour. It is made throughout of tinned-copper.—*Alder & Mackay, Ltd., New Grange Works, Edinburgh, 11.*

## 'Oxylene Boram'

A new fire retarding coating has been specially developed to meet situations where protection from fire and flame spread is required but where impregnation of the elements is impracticable.

It is a phosphate resin compound based on anti-pyrine chemicals, as used in the 'Oxylene' process. The constituents are supplied in powdered form, which, with the addition of water, form a mixture suitable for application by brush or spray.

'Oxylene Boram' gives a white, durable and non-flaking finish, is easy to mix, provides a good coverage, and is economical to use. It is suitable for application to practically all interior surfaces. When used in exterior positions, a protective coat of paint should be added. —*The Timber Fireproofing Co., Ltd., Market Bosworth, Nuneaton.*

## Rapid Hammer

About two years ago, at the last Building Exhibition at Olympia, Adam & Harvey (Rapid Hammer), Ltd., introduced a revolutionary method of fixing into hard materials. The 'Rapid Hammer' had been developed in Germany, and parallel research had taken place in the U.S.A. Today more than 10,000 'Rapid Hammers' are in use. The main reason for this is that the hammer is a simple and workmanlike tool, completely safe to handle, and efficient and reliable even after prolonged hard use on building sites.

The system employed consists briefly in hardened steel bolts being literally 'shot' by means of a small cartridge into hard material, such as concrete, steel, and brickwork. Several methods of fixings are available, such as nail-type bolts for direct nailing—for example, timber to concrete or brick. Bolts with a male threaded head for permanent screwed fixings into concrete, brick, or steel, and bolts with a female thread for detachable fixings.

The speed and rapidity of operation eliminates all need for chiselling, plugging, or outside power, and results in most substantial saving of time and labour.

The 'Rapid Hammer' has, therefore, found wide acceptance in all branches of the building industry. Apart from this, it is being used in many other industries, including the gas industry.

The R.5 hammer is designed for ¼-in. threaded bolts, and the R.10, which is a universal tool, is suitable for both ¼-in. and ⅜-in. Whitworth threaded bolts, and is supplied with interchangeable barrels for this purpose. These tools are of robust construction, ensuring long and reliable service with little or no maintenance costs.

The hardened steel bolt is directly attached to the selected cartridge by hand, the bolt head being tapered to ensure a firm fit. There is a wide variety of fixings available for many applications. A quick release thread enables the user easily to withdraw the barrel and insert the assembled bolt and cartridge. Having returned the barrel to the tool the hammer is then ready for use.

Three safety devices have to be employed before the hammer is fired. The tool must be firmly placed at right angles to the material into which the fixing is required. The rear handle is then depressed releasing the first safety catch. It is then necessary to depress the push button situated at the centre of the tool.

Extra pressure is then given in a forward direction when the barrel will telescope into the pit of the hammer. When the barrel is fully depressed the firing pin is brought into action and the fixing is discharged.

Even though the tool may be loaded it is quite impossible for the bolt to be discharged unless the safety devices are released in their correct order, even when dropped or roughly handled.—*Adam & Harvey (Rapid Hammer), Ltd. Greenwich House, 10-13, Newgate Street, London, E.C.1.*

## Refractory Bonding Mortars

Repairs to the refractory linings of water-tube boilers represent a large proportion of the maintenance cost of boiler installations.

There is little comparative information at present available about refractory mortars, and XZIT (G.B.), Ltd., have recently carried out a series of comparative tests on 'Brickseal Bond,' a refractory bonding material of their manufacture which is designed to increase the life of furnace linings.

In most boilers, firebricks are usually secured to the boiler casing by some form of bolt or key in addition to being laid with a refractory mortar. Experience has shown that the most common trouble in boilers is due to failure of the securing arrangements, where the bolthead burns away, or it becomes displaced or cracks form across the bolt hole. When these securing devices fail, the stability of the wall depends entirely on the ability of the mortar used for laying up the firebricks having sufficient bonding strength to hold together the bricks and the wall in position.

Unless the refractory mortar has a high bonding strength it becomes displaced by vibration or expansion and contraction, all of which are unavoidable under operating conditions. In the case of sloping walls in which it may not be possible to install securing bolts, the bonding strength of the mortar used is the factor on which the life of the wall depends. Where a mortar with a weak bond has been used, the bottom bricks of a sloping wall become dislodged by vibration and the weight of the firebricks in the rows above make the wall unstable and necessitate rebricking.

The main function of a refractory mortar is, therefore, to bond the brickwork into a solid unit, so that it will be more resistant to shocks and stresses, making the joints gas tight and preventing the penetration of slag.

To assess the qualities of various bonding mortars, XZIT (G.B.), Ltd., have had a series of tests carried out by Mr. W. Killner, a Principal Scientific Officer recently retired from the Admiralty, who is an accepted authority on furnace refractories. Six well-known brands of refractory mortars were tested alongside 'Brickseal Bond' mortar.

All the mortars examined were similar in that they were found to be sufficiently refractory to withstand operating conditions and fine enough to allow a thin joint to be made, but they differed markedly in bonding strength.

The method of test used to determine the bonding strength was that laid down for bonding mortars in the American Society for Testing Materials; Standards on Refractory Materials. In this method, the bonding strength is determined by cementing two half bricks together on the 2½ in. × 4½ in. face with a joint ⅛ in. thick. After drying, the joints are broken by applying a load, using a standard machine.

The actual load tests to determine the modulus of rupture were carried out by a London firm of consulting engineers and the following results were obtained:

| Brand | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | 'Brickseal' |
|---|---|---|---|---|---|---|---|
| Modulus of rupture, lbs. per sq. in. .. | 142 | 7 | less than 7 | 76 | 23 | 126 | 283 |

The A.S.T.M. Specification requires a mortared joint to have a modulus of rupture of not less than 200 lbs. per sq. in., and these tests show that the 'Brickseal' mortar is the only one of the seven types examined which complies with these requirements.—*XZIT (G.B.), Ltd., 175, Piccadilly, London, W.1.*

## Heavy Duty Torch

The General Electric Co., Ltd., has introduced a new heavy duty torch. Known as the BA 615 and developed as a standard torch for employees of the North Thames Gas Board, it lends itself readily to many other industrial applications and has now been made available for general sale. It is particularly suitable for inspectors, fitters, maintenance engineers, and others occupied in such services as gas and electric supply.

The body is of rust-proofed steel finished with a high gloss black stove enamel, so that the torch will stand up to the roughest use. The length of the torch is 3½ in. and, being compact and flat, it slips conveniently into the pocket. A feature of its construction is that all the parts are replaceable and can be fitted by the user without special tools.

The torch is fitted with an Osram 3.5 V 0.3 A bulb and operates off a G.E.C. 4½ V heavy duty battery BA 6122; complete with the battery the torch weighs 15½ oz.

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***have an international reputation for accuracy, reliability and high-class workmanship. They indicate, record and control temperatures from — 200° C. to + 2,000° C.***

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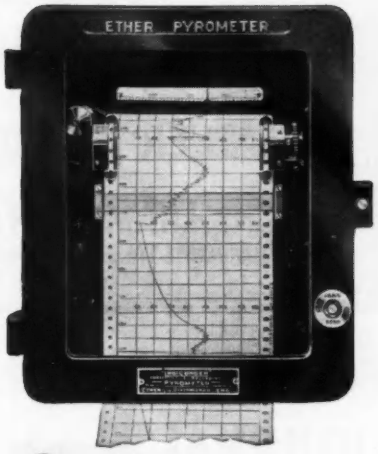

## EDGEWISE PYROMETER INDICATOR

This instrument will indicate temperatures from — 200° C. to + 2,000° C. rapidly and accurately, and is used in conjunction with resistance bulbs, thermo-couples and radiation tubes as the heat sensitive elements. It is made in various sizes having scales 4 in., 5 in., 7 in., and 10 in., long

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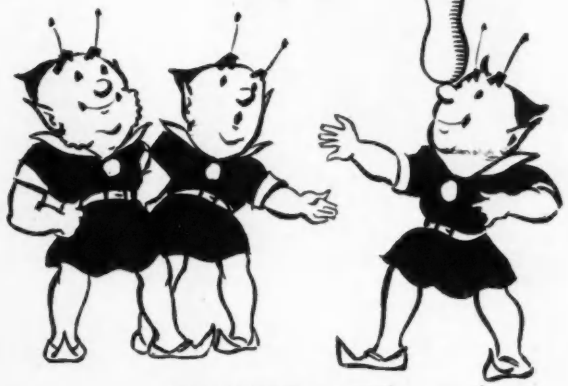

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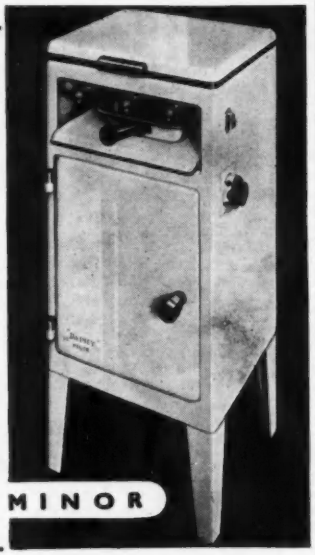
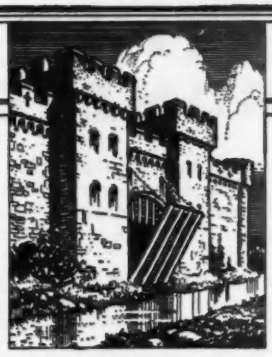
*Approved and adopted by leading gas boards*

The **Dainty** MINOR



R. RUSSELL & SONS, LTD., DERBY
*Agents for Scotland and Northern Ireland:*
JAMES R. THOMSON & CO. LTD., 41, YORK STREET, GLASGOW, C.2



PROTECTION

GAUNTLET

# GAUNTLET
WEATHER TESTED PAINTS

ARCHD H. HAMILTON & CO. LTD
27-37 BARDOWIE STREET POSSILPARK GLASGOW.N

# Bind your JOURNAL each week

*Gold lettered on the spine complete with instruction sheet.*

## No loose copies to be mislaid

We offer Journal readers a simple method of temporarily binding their copies as received week by week. No time lost searching for a particular issue; Journals removed and replaced in a few seconds. Designed to hold 13 issues, and whether completely or only partially filled the book effect is always maintained.

Price **12/6** each plus 9d. postage.

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# PUBLISHERS' NOTICE

The "Gas Journal" is published every Wednesday, price 1/3d.; by post 1/5d.

**Subscription Rates:** Home and Empire:—52/- per annum; Foreign:—60/- per annum. (Both payable in advance.) A copy of the "Gas Journal" Calendar & Directory is presented each year to continuous subscribers.

**Classified Advertisements:** All small classified advertisements are charged at 1/9 per line (approx. 7 words)—minimum charge 10/6. A Box Number address occupies 2 lines, and a further 6d. is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

**Displayed Advertisements:** Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received 14 days prior to publication if proofs are required. Type area of inside pages 10" deep × 7" wide; block screen 120.

**BUSINESS MANAGER: S. T. CULLEN**

MIDLANDS OFFICE: 10, Union Street, Birmingham.

NORTHERN MANAGER: W. Q. Foster, 33, St. Helens Road, Harrogate. *'Phone:* Harrogate 84291.

**WALTER KING, LTD., 11, Bolt Court, Fleet Street, London, E.C.4.**

*Telephone:* CENtral 2236-7. *Telegrams:* Gasking, Fleet, London.



# OXIDE

DUTCH AND DANISH BOG ORE

SPECIALLY ACTIVATED OXIDE OF IRON

Oxide supplied on loan or sale outright.
Highest prices paid for Spent Oxide.

Send your enquiries to

**GAS PURIFICATION & CHEMICAL COMPANY LIMITED**

ESTABLISHED 1873

PALMERSTON HOUSE, OLD BROAD STREET, LONDON, E.C.2.

Telegrams: "Purification, Stock, London." Telephone: London Wall 5077

# FIRE!

ANYTHING SO FAST AS

# NU-SWIFT?

Large fires generally start as small ones. Speed is vital. Fire engines sometimes carry Nu-Swift but why waste precious minutes! Rapid and reliable Nu-Swift should be on the spot—always!

NU-SWIFT LTD · ELLAND · YORKS

*In Every Ship of the Royal Navy*

# "KLEENOFF" *

THE COOKER CLEANER

# "KLEENOFF"

FIBRE BRUSHES
RUBBER MOPS

# "KAY-DEE" *

KETTLE DESCALER

*For resale to the public, and in bulk for Works use.*

**BALE & CHURCH, LTD.**

CROMPTON WAY, CRAWLEY, SUSSEX.


## APPOINTMENTS VACANT

*The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.*

### NORTHERN GAS BOARD

WESTERN GROUP
TECHNICAL ASSISTANT—
CARLISLE DIVISION

**APPLICATIONS are invited for the above** appointment.

Applicants should be experienced in the operation and maintenance of continuous vertical retorts with modern ancillary plant.

The salary will be in accordance with Grade A.P.T. VI of the National Salary Scales (£490-£570 per annum).

The successful applicant will be required to pass a medical examination and be subject to the provisions of the Board's Staff Pension Scheme.

Applications stating age, training, qualifications and experience should be addressed to the Divisional General Manager, Gas Works, Rome Street, Carlisle, not later than December 5, 1953.

A. R. CROFT,
Group General Manager.

### WALES GAS BOARD

MERTHYR TYDFIL AND
DOWLAIS UNDERTAKING

**APPLICATIONS are invited from suitably** qualified and experienced persons for the appointment of TECHNICAL ASSISTANT for Distribution Department.

Applicants should be experienced in modern distribution practice including the preparation of specifications, drawings and estimates.

The salary will be within Grade A.P.T. VI (Prov. 'A') (£490-£570 per annum) of the National Salary Scales. The post is superannuable and the successful applicant will be required to pass a medical examination.

Applications stating age, training, experience and qualifications, accompanied by the names of two referees, should reach the undersigned within fifteen days of the appearance of this advertisement.

D. E. WEST,
Engineer & General Manager.

Wales Gas Board,
Merthyr Tydfil & Dowlais Undertaking,
Gas Offices,
143, High Street,
Merthyr Tydfil, Glam.

### WALES GAS BOARD

ABERDARE VALLEY UNDERTAKING
DISTRIBUTION SUPERINTENDENT

**APPLICATIONS are invited for the position of** DISTRIBUTION SUPERINTENDENT in the above Undertaking within the Staff Salary Scale A.P.T. VIA inclusive. A house is available at Aberaman.

Applicants must be able to supervise major extensions to the gas distribution system, and take charge of the main and service layers and fitters.

Previous experience in planning and carrying out installations in consumers premises and preparing schedules of quotations is essential.

The successful applicant will be expected to contribute to the Board's Superannuation Scheme, and submit to a medical examination.

Applications, giving age, qualifications and experience, together with the names of two referees, should reach the undersigned not later than December 5, 1953.

DAN T. PHILLIPS,
Engineer & Manager.

Gas Offices,
Aberaman,
Aberdare.

### DRAUGHTSMAN

(SENIOR)

age over 30, required for large constructional engineering company in the Midlands. Wide gas holder and plate-work experience essential. Good opening for right man. Pension scheme.

Write, in confidence, stating age, experience, qualifications and salary required to: Personnel Manager, Box 397, 19/21, Corporation Street, Birmingham, 2.

**ESTABLISHED FIRM in South Midlands** invites applications for a post as ASSISTANT to the Works Chemist. Duties will be to maintain Laboratory Control of processes involved in large Vitreous Enamelling Department dealing with sheet steel products. Previous experience in vitreous enamelling essential. General scientific education up to Inter. B.Sc. standard desirable. Pension scheme is in operation. Applicants should give, in strict confidence, full details of experience, past positions and salaries and present circumstances to: No. 172, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

### EASTERN GAS BOARD

NORWICH DIVISION

TECHNICAL ASSISTANT—NORWICH WORKS

**APPLICATIONS are invited for the position of** TECHNICAL ASSISTANT at the Norwich Works, at a commencing salary within the range of Grades A.P.T. 6 and 7 of the National Salary Scales for Gas Staffs.

Candidates should possess suitable qualifications, and experience with Glover West Continuous Vertical Retorts would be an advantage.

The successful applicant will be required to pass a medical examination and join the Board's Superannuation Scheme.

Applications, stating age, qualifications and experience, together with the names of two referees, should reach the undersigned within 14 days of the appearance of this advertisement.

J. V. KNIGHT,
Manager, Norwich Group

Eastern Gas Board,
Bishop Bridge,
Norwich.

### EASTERN GAS BOARD

NORWICH DIVISION

LOCAL MANAGER—
NORTH WALSHAM

**APPLICATIONS are invited for the position of** LOCAL MANAGER of the North Walsham Undertaking, which has an annual output of 27 million cubic feet.

Applicants should have a good working knowledge of small works and the control and operation of stop-ended hand charged horizontal retorts.

Knowledge of district work and experience in supervising the work of Gas Fitters and Servicelayers would be an advantage.

The commencing salary would be within the range A.P.T. IV and V, Provincial 'B' (£290-£525) and a house will be available on a service tenancy.

Applications, giving details of age, qualifications, experience, and present employment should be submitted in writing to the undersigned not later than fourteen days after the appearance of this advertisement.

J. V. KNIGHT,
Manager, Norwich Group,

Eastern Gas Board,
Bishop Bridge,
Norwich.

(*Classified Advertisements continued on page* 486)

## APPOINTMENTS VACANT (ctd.)

### WEST MIDLANDS GAS BOARD

BIRMINGHAM & DISTRICT DIVISION
DEPUTY WORKS ENGINEER—
SWAN VILLAGE WORKS,
BIRMINGHAM DISTRICT

**APPLICATIONS are invited from suitably** qualified persons for the above position. The Works has a daily capacity of 14 million cubic feet of coal gas and 8 million cubic feet of carburetted water gas, and the person appointed must be capable of taking charge of the Works in the absence of the Engineer.

Candidates should have had sound practical training and have held a responsible position on a large Gas Works. Corporate Membership of the Institution of Gas Engineers is a necessary qualification.

The salary will be within the range £1,025 to £1,225 per annum.

The post is pensionable and the successful candidate will be required to pass a medical examination.

Applications, giving details of age, qualifications and experience, together with the names of two referees, should be addressed to the Industrial Relations Officer, West Midlands Gas Board, 6, Augustus Road, Edgbaston, Birmingham, 15, to reach him within fifteen days of the appearance of this advertisement.

F. H. CURETON,
Secretary to the Board.

### SCOTTISH GAS BOARD

ALLOA/STIRLING SUB-GROUP
ALLOA DISTRICT
WORKS TECHNICAL ASSISTANT

**APPLICATIONS are invited from qualified** persons for the above appointment at Alloa Gas Works. Candidates should be experienced in the operation of continuous vertical retorts, CWG plant and modern ancillary plant.

The salary will be within Grades A.P.T. IV-VI (max. £570 per annum). The post is superannuable and the successful candidate may be required to pass a medical examination.

Applications stating age, education, training, qualifications and experience should be sent to the undersigned within fourteen days of the publication of this advertisement.

W. M. GLEDHILL,
Sub-Group Manager.

Bank Street,
Alloa.

### SCOTTISH GAS BOARD

NORTHERN DIVISION
ABERDEEN DISTRICT
TECHNICAL ASSISTANT—DISTRIBUTION

**APPLICATIONS are invited from persons with** appropriate technical qualifications and experience in all branches of gas distribution.

The salary will be Grade VI, Provincial 'A' of the National Salary Scale for Gas Staffs (£490-£570 × £20 per annum) with placing according to experience and qualifications.

The successful candidate will require to participate in the Superannuation Scheme of the Board and may require to pass a medical examination.

Applications stating age, qualifications and experience, together with the names of two referees, should be submitted to the undersigned by Monday, November 30, 1953.

H. S. MILNE,
Divisional Controller.

50, Cotton Street,
Aberdeen.
November 10, 1953.

### SCOTTISH GAS BOARD

NORTHERN DIVISION—ELGIN SUB GROUP
SUB GROUP TECHNICAL ASSISTANT

**APPLICATIONS are invited for the position of** TECHNICAL ASSISTANT in the Elgin Sub Group. The salary will be within Grade A.P.T. VI of the National Joint Council for Gas Staffs, Provincial 'B' scale (£475-£555 per annum).

Candidates should possess appropriate technical qualifications and have had experience in operating carbonising plant.

The successful candidate will be required to travel to the various Works in the Sub Group; also pass a medical examination and become a member of the Board's Superannuation Scheme.

Applications, stating age, experience and qualifications, should be addressed to the undersigned and posted to arrive within ten days of the appearance of this advertisement.

F. B. KERR,
Sub Group Manager.

Gas Works,
Pinefield,
Elgin.
November 13, 1953.

### EAST MIDLANDS GAS BOARD

NOTTS & DERBY DIVISION
SENIOR ACCOUNTING ASSISTANT—
DERBY GROUP ACCOUNTANTS

**APPLICATIONS are invited from persons who** possess a recognised accountancy qualification for the above mentioned appointment. Salary Grade A.P.T. VII (£545/625 per annum) commencing at a figure commensurate with qualifications and experience.

The successful candidate may be required to pass a medical examination, and unless already subject to a pension scheme by virtue of the Gas (Pension Rights) Regulations, 1950, will be required, if eligible, to join the Board's Staff Pension Scheme within six months from taking up the appointment.

Applications stating age, education, qualifications and accounting experience, together with the names of two referees should be addressed to the undersigned not later than Saturday, November 21, 1953.

K. L. PEARCE,
Divisional General Manager.

East Midlands Gas Board,
Notts & Derby Division,
Friar Gate,
Derby.

### GUERNSEY GAS LIGHT COMPANY LTD.

**APPLICATIONS are invited for the position of** ASSISTANT ENGINEER AND MANAGER to the above Company.

Candidates should have a comprehensive knowledge of gas manufacture and distribution, with some administrative experience.

Applicants should furnish details of training, experience and qualifications and should state the salary required. *Copies* of three Testimonials should be enclosed.

Envelopes to be marked 'Confidential' and addressed to the undersigned, should arrive not later than December 15, 1953.

S. G. VANE,
Engineer & Manager.

16, Smith Street,
Guernsey.

### NORTH WESTERN GAS BOARD

WIRRAL GROUP
STATION ENGINEER—ELLESMERE PORT

**APPLICATIONS are invited for the above** pensionable appointment at a salary within Grade A.P.T. XII (£740-£865 per annum) according to experience and qualifications.

The successful applicant will be responsible to the Group Production Engineer for the operation and maintenance of the gas works.

Candidates should possess the Higher National Certificate of the Institution of Gas Engineers, or equivalent qualification, and preferably have had experience in the control of vertical retorts.

Detailed applications, giving the names of two referees, should reach the General Manager, North Western Gas Board (Wirral Group), Hind Street, Birkenhead, within ten days.

### NORTH WESTERN GAS BOARD

NORTH CHESHIRE GROUP
CARBONISING SUPERINTENDENT—
PORTWOOD WORKS, STOCKPORT

**APPLICATIONS are invited for the above** pensionable appointment at a salary within Grade A.P.T. X (£665-£765 per annum).

The successful applicant will be responsible to the Station Engineer for the operational supervision and technical control of Woodall-Duckham Continuous Vertical Retort Plant (nominal capacity 9 million cu. ft. per day) and modern C.W.G. Plants.

Applicants should preferably possess the Higher Grade Certificate (Gas Engineering—Manufacture of the Institution of Gas Engineers, or an equivalent qualification.

Detailed applications, giving the names of two referees, should reach the General Manager, North Western Gas Board (North Cheshire Group), Great Portwood Street, Stockport, within fourteen days of the date of this advertisement.

### CITY COUNCIL OF SINGAPORE

GAS DEPARTMENT

**APPLICATIONS are invited for the post of** ASSISTANT DISTRIBUTION ENGINEER on a 3 years' agreement in the first instance.

Applicants must be between 23 and 27 years of age and should preferably be unmarried. They must hold at least the Ordinary Grade Certificate of the Institution of Gas Engineers in Engineering (Supply) and it is desirable that they also hold the City & Guilds Certificate in Gas Fitting (Final Grade). They must have a good practical knowledge of gas fitting, mains and service laying and it is also desirable that they have a background knowledge of the modern application of gas in industry and experience of repairs to dry meters. Applicants must have had at least two years administrative and supervisory experience in the Distribution Department of a Gas undertaking.

The commencing salary offered is between $550 per month (£770 per annum) and $670 per month (£938 per annum) depending upon qualifications and experience.

If placed on the permanent establishment after satisfactory completion of the Agreement the basic salary will be in the scale $550 rising to $1,070 per month (£770 to £1,498 per annum).

Expatriation allowance and cost of living allowance at such rates as may be approved by the Council from time to time are payable. The existing rates are as follows:—

Expatriation Allowance—£287 per annum on basic salaries up to $740 a month;

Cost of living allowance—£238 per annum on basic salaries of $550 to $910 a month for a single man; £315 per annum rising to £348 per annum on basic salaries of $550 to $670 a month for a married man with no children; £412 per annum rising to £471 per annum on basic salaries of $550 to $670 a month for a married man with one or more children.

For a single man the minimum total emoluments on a basic salary of $550 per month would thus amount to £1,295 per annum; for a married man with no children £1,372 per annum; and for a married man with one or more children £1,469 per annum. $1 equals 2s. 4d.

Partly furnished quarters provided if available at 8% of basic salary or housing allowance paid in lieu.

Tourist class passages will be provided for the officer appointed, his wife and own children under the age of 12 years at the date of sailing, subject to a maximum of three full passages.

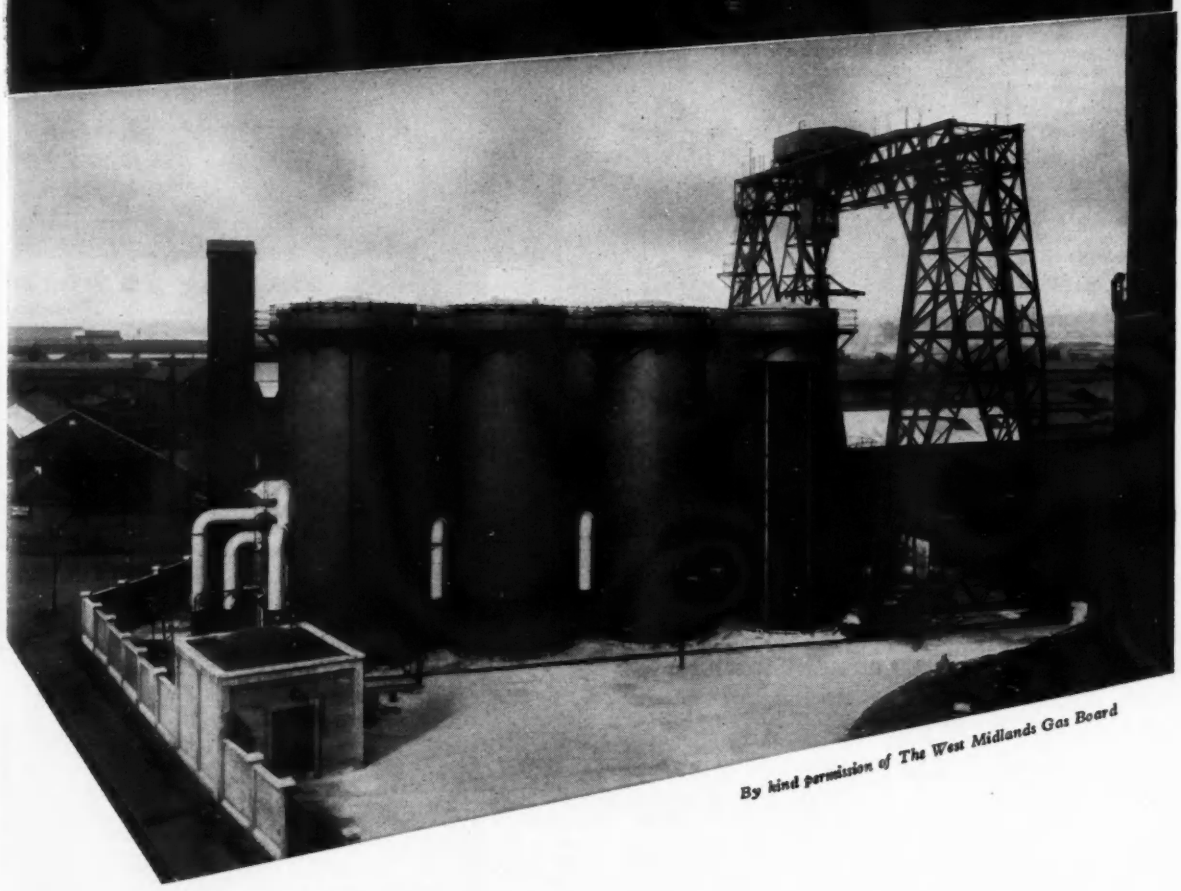
Leave—1 month per year of service plus period of voyage, on satisfactory termination of agreement or 4 days a month of resident service plus voyage leave after 48 months if appointed to the Permanent Staff and thereafter at shorter periods. 14 days local leave per year.

Compulsory Provident Fund contributions at present 7½% of salary to which the Council donate 7½% rising to 10% after 10 years' service, 15% after 15 years' service and 20% after 20 years' service. This scheme is under review.

Applications in DUPLICATE giving full technical and personal information with *copies* of 3 recent Testimonials in duplicate to Messrs. Allen & Williams (Agents to the City Council), 1, Victoria St., London, S.W.1, before Tuesday, December 8, 1953.

STRINGER BROTHERS
ALBION. WEST BROMWICH
S.B
IRON & STEEL
PLATES &
SHEETS
BARS & SECTIONS
Telephone:
WEST BROMWICH 0436-7

# TOWER PURIFIERS



By kind permission of The West Midlands Gas Board

## A tight corner...

The Tower Purifiers above are installed on a long, narrow site between a Gasholder and the Works boundary. The Towers are placed at one end of the site. A covered space at the other end, with plant for mechanical loading and mechanically assisted unloading of containers, ensures smooth and easy handling of oxide.

**W. C. HOLMES & CO. LTD.**

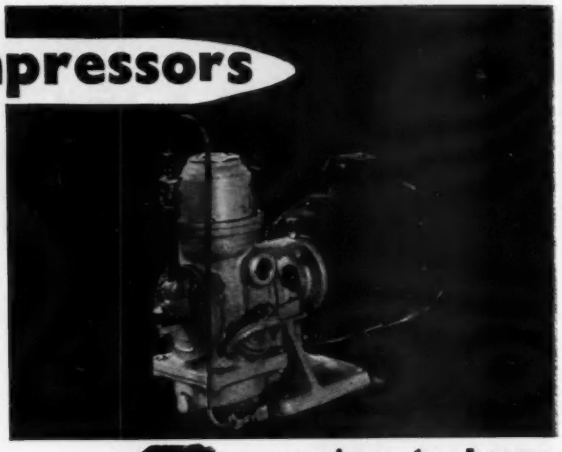
HUDDERSFIELD · LONDON · BIRMINGHAM

Tel: Huddersfield 5280 London: Victoria 9971 Birmingham: Midland 6830

FOUNDED 1890 HOLMES HUDDERSFIELD

C1681-1

# industrial gas compressors



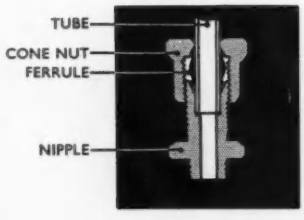
**FOR COMPRESSING AIR OR GAS SUPPLIES USED FOR FURNACE HEATING, METAL MELTING, BRAZING, SOLDERING BITS, LAUNDRY IRONS, ETC.**

**DIRECT COUPLED COMPRESSORS** (see illustration right) are fitted with automatic internal by-pass valves and lubrication systems. They are direct coupled to Keith Blackman motors. Type OA compressors in this range occupy a floor space of only 18" × 7½".
**CAPACITY RANGE:** 100 to 750 cub. ft. of gas or air per hour at 3 lbs. per sq. in. pressure.

**TYPE 4 COMPRESSORS** (not illustrated) are also fitted with automatic internal by-pass valves and lubricators. The complete unit includes motor and drive on a common bedplate, all of Keith Blackman manufacture.
**CAPACITY RANGE:** 500 to 20,000 cub. ft. of gas or air per hour at 3-5 lbs. per sq. in. pressure.
**AREA OCCUPIED:** from 9¼" × 16½" to 61" × 27".

## DID YOU KNOW?

KEITH BLACKMAN have been making compression joints for many years and the present design embodies features developed as a result of this long experience. Notice that the shape of the ferrule is such that the joint is made without unduly stressing the tube.




Keith Blackman LIMITED
MILL MEAD ROAD, TOTTENHAM, LONDON, N.17
Phone: Tottenham 4822 (twelve lines) Grams: "Keithblac, Norphone, London"
BRANCH OFFICES AT MANCHESTER, BIRMINGHAM, LEEDS, GLASGOW, NEWCASTLE-ON-TYNE, PENARTH near CARDIFF, AND BELFAST

## serving to burn

*Note: the four burner heads (right) are for high pressure gas, or low pressure gas and air blast.*

**LEFT: "Fishtail" type burner** with two-armed stamped pattern injector for heating liquid in tanks by submerged combustion tubes. For use with low pressure gas supplies.
**Size Range:** 1", 1¼", 1½", 2" and 2½" outlets.
**Capacity Range:** 45-280 cub. ft. of gas per hour.

**Brass non-blow-off head types:** deal with 5 to 10 cub. ft. of gas per hour.

**Stainless steel, "F" type head, burner:** deals with 8 cub. ft. of gas per hour.

**Perforated head type burner:** deals with 10 to 15 cub. ft. of gas per hour.

## INDUSTRIAL GAS EQUIPMENT

524

# There's 4 MILLION FEET OF PROOF that FRANCOIS BORED PILES GIVE GREATER STRENGTH & STABILITY to foundations of every type.

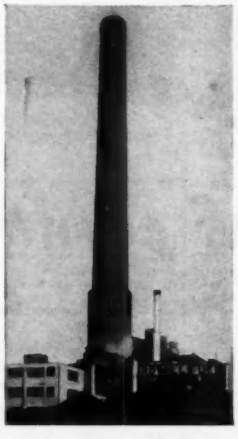
From the investigation of the site to the completion of the job, the Cementation Co. Ltd. provide a complete world-wide service on foundations and underpinning, which is unrivalled for experience, facilities and resources.

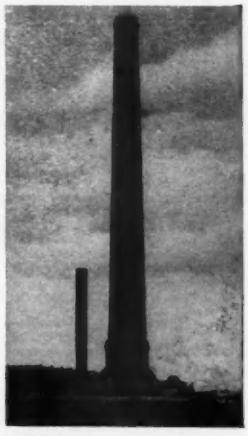
Time has proved, over and over again that concrete piles and cementation methods not only give the greatest strength and stability to many types of foundation, but are often the only solution in certain difficult conditions.

In addition there is no harmful vibration, distortion or excessive noise during construction.

The successful completion of over 4 million feet of Bored Piling during the last fifteen years is an achievement which speaks for itself.

*Left: Trial borings for reconstruction of Coventry Cathedral.*





*Two of the largest chimneys in the British Isles; on foundations of Francois Concrete Piles (left) and Francois Cementation Piles (Right).*

Write for your copy of our new booklet about Bored Piling.

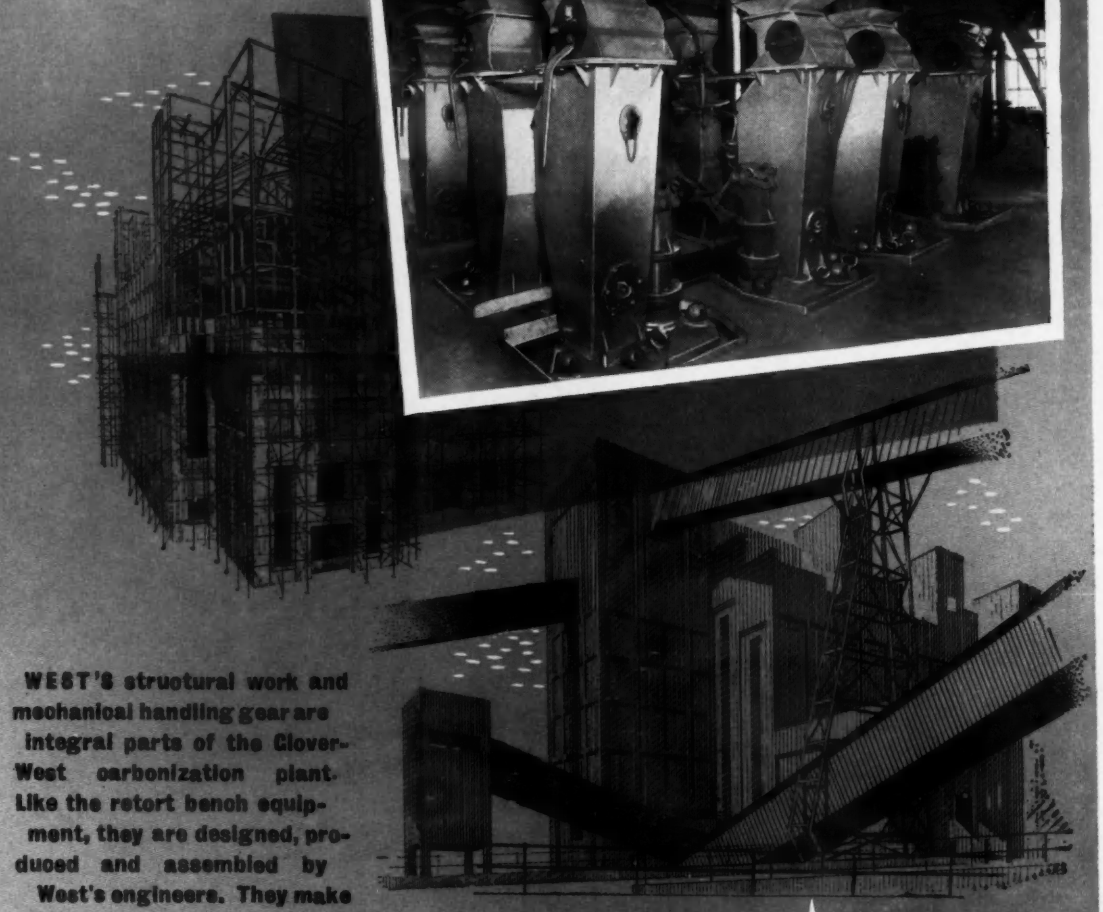
The CEMENTATION COMPANY LIMITED

London Office: 39, Victoria St., S.W.1. Tel. ABBey 5726

**BENTLEY WORKS, DONCASTER Telephone 54177-8-9**


Registered as a Newspaper. Printed by STRAKER BROTHERS LTD., E.C.2 for WALTER KING LIMITED, 11, BOLT COURT, FLEET ST., LONDON E.C.4. Wednesday, November 18, 1953.

# Behind the Retorts



WEST'S structural work and mechanical handling gear are integral parts of the Glover-West carbonization plant. Like the retort bench equipment, they are designed, produced and assembled by West's engineers. They make an important contribution to the efficiency of the system. In addition, they provide practical evidence of the availability to the gas industry of an experienced service in the structural and mechanical handling fields.

WEST'S GAS IMPROVEMENT CO. LTD

ALBION IRONWORKS · MILES PLATTING · MANCHESTER 10

Telephone: Collyhurst 2961. Telegrams: Stoker, Manchester.

London: Columbia House, Aldwych, W.C.2. Phone: HOLborn 4168. Grams: Wesgasco, Estrand.

We are Exhibiting at the Fuel Efficiency in Industry and Home Exhibition NOV. 18-28 1953 CITY HALL DEANSGATE MANCHESTER ORGANISED BY PEARSON EXHIBITIONS LTD

SMI

# The gas fires the public want

The F.A. Neat gas fires are easy to sell because they provide splendid heating at very low cost. The secret is in the Neat burners, the high-efficiency radiants and the scientifically planned heat distribution.

The Neat burners have a quite exceptional performance. They:

Give perfect combustion with exceptional heat output for gas consumed.

Burn quite silently, there is no hiss even when the gas is turned down.

Cannot light back, however low the gas.

The two portable fires, FA/3 and FA/8, have unbreakable steel radiants, which have an *exceptionally* long life.

All F.A. Neat fires are made by the manufacturers of the famous Ascot gas water heaters to the same high standard of quality and performance.

To prevent accidents all models are fitted with guards conforming to the new British Standards Specification 1250.

*Sole manufacturers and distributors*

**ASCOT GAS WATER HEATERS LTD** 255 NORTH CIRCULAR RD • NEASDEN N W 10 • WIL 5[illegible]